

The Iron Age

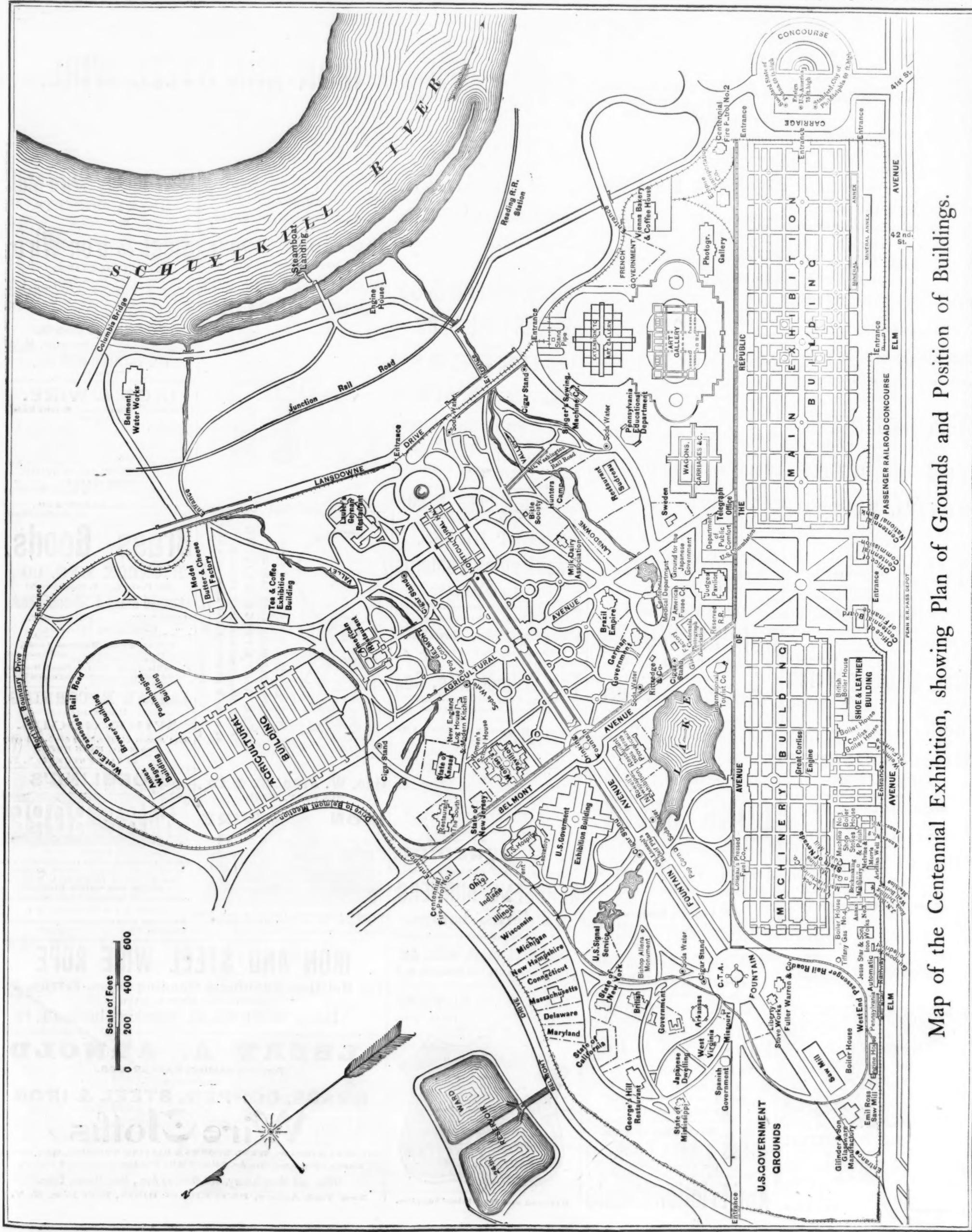
A Review of the Hardware and Metal Trades.

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Map of the Centennial Exhibition, showing Plan of Grounds and Position of Buildings.

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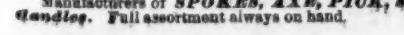
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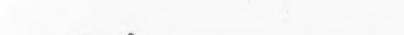
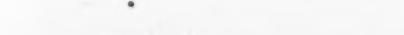






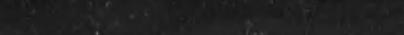









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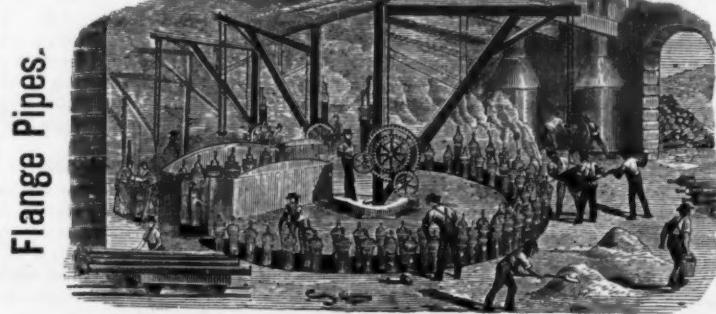
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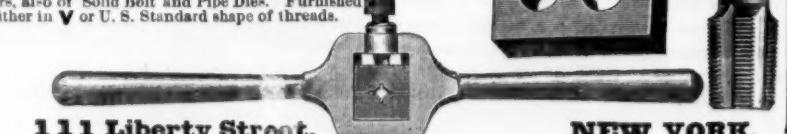


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2. Driving out the pin when desired is easily done by merely tapping under the plug at A.

3. It is impossible for the door to be opened from the outside by removing the pins, as this cannot be done when the Butt is closed. This is a valuable feature in the case of doors opening on porches or halls.

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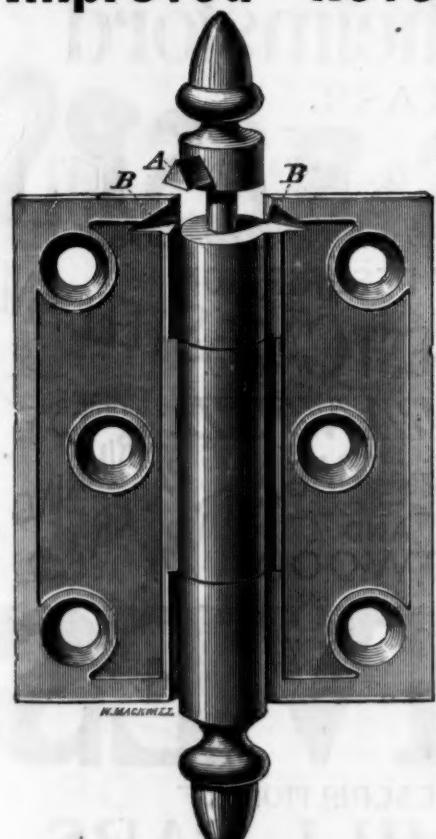
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Water Pipes.

(Continued.)

A piece of lead pipe, 0·16 inches thick, which had been in use in Hanover for conducting well water for 18 years, was found perfectly coated on the inside with a quite firmly adhering gray crust 1·83, or 0·012 inch thick, which consisted chiefly of carbonate and sulphate of lead, with some carbonate of lime; otherwise the pipe was perfectly good. An analysis of the well water, made December 1, 1873, showed that it contained the following ingredients:

| | Mg. per liter. | Grains per gallon. |
|-------------------------|----------------|--------------------|
| Chlorine | 61 | 3·55 |
| Sulphuric acid | 125 | 7·29 |
| Nitric acid | 38 | 2·22 |
| Organic matter | trace | trace |
| Lime | 94 | 5·48 |
| Magnesia | 265 | 15·45 |
| Precipitated by boiling | 45 | 2·62 |
| Carbonate of lime | 257 | 14·94 |
| Carbonate magnesia | 5 | 0·29 |
| Total hardness | 328 | |

The owner states that when the new pipe was first put in, the water was cloudy in the morning, and then became clear. It is presumed that at first the lead pipe was strongly attacked under the influence of the bicarbonate of lime, the nitrates, chlorides and sulphates, when carbonate of lime was thrown down and basic lead compounds formed, part of which remained suspended in the water, making it turbid, while another part formed the crust just mentioned, which now protects the lead pipe from further attack. At present, notwithstanding the comparatively large amount of organic matter and nitrates in the water, it does not contain a trace of lead.

Laboratory experiments, made in the manner heretofore in use, are not by any means sufficient to decide the question whether lead pipe may be safely employed for service pipe. Here it can scarcely come into consideration whether lead pipe is attacked by a certain water in the first two or four weeks, and hence, when the water has stood a few hours in the pipe, it contains traces of lead suspended or dissolved in it. It would then suffice to allow a corresponding quantity of water to run out until it was free from lead. The most important matter to be decided first is, whether the pipe is perpetually attacked. Evidently this question can only be decided by regular analyses of water from many pipes, taking particular care to observe all the relations practically occurring, which could aid or retard the solution of the lead.* Lead pipe is unobjectionable for water, which, like that of Hanover, contains mere traces of organic matter and nitrates, and, on the other hand, large quantities of bicarbonate of lime and magnesium.

Philips observed in 1845, that lead could be removed from water containing it by simply filtering through paper; hence he supposed that the lead was merely suspended in the water. Yorke, however, found that lead in solution is held back by the fiber of the paper.

Kersting and Varrentrapp recommend the introduction of carbon filters for removing the last traces of lead. Bobierre proposed, in *Comptes Rendus* for 1873, to filter through limestone. Where lead pipe is attacked by the water, it is certainly advisable to filter through carbon.

It was first proposed to protect lead pipe from the action of water by covering with a coat of white lead paint. Christison observed that lead pipe which had been treated with a dilute solution of phosphate of soda was no longer attacked by water. Parkes confirms the protective power of the phosphates. H. Schwarz recommended treating lead pipes with a solution of sulphide of potassium, so as to convert the surface into sulphide of lead. Wilim, also, confirms its protective value.

Where a solution of lead is to be feared, sulphurated pipes may be employed, such as are used in Frankfort, Kiel, Leipzig and Wiesbaden.†

TINNED LEAD PIPE.

To prevent the corrosion of lead pipe by water it was covered with tin. This is not a new invention, for tinned lead pipes were described by Ellis & Burr, in 1837. (See *Dingler*, lxi, 34.) Boettger and Von Pettenkofer believe that lead is protected from the action of water by the more electro-positive tin. Yorke found that lead was positive when in contact with iron, but when the surface was oxidized it became negative; Elmer says that lead in contact with tin is positive, and hence tinned lead pipes are very frequently strongly corroded.

Pleischel lays particular stress on the statement that, contrary to the common belief, lead is electro-positive toward tin, and precipitates it from its solutions. Walkley has already reported that lead pipes are very strongly attacked when soldered with tin; he has observed a strong evolution of hydrogen in such pipes. Smith and Kersting have observed that lead which contains tin, or is covered with tin, is more strongly acted upon by water than pure lead, and Calvert also says, carefully tinned lead pipe is attacked by water. Stumpf has seen a tinned lead pipe eaten through in four weeks.

A lead pipe 4 mm. (0·16 inch) thick, used for well water, had partially remained in good condition after nearly two years' use, yet was without incrustation, but in other parts was corroded to the depth of 2 to 3 mm., and in a few places was entirely eaten through, the holes being in rows mostly in the direction in which the tubes are drawn. That portion of the pipe which dips into the water was also infested with numberless holes on the outside, arranged in parallel rows, but were not so deep as on the inside.

* Lead pipe is used for service pipe in Altenburg, Berlin, Bochum, Danzig, Dornmund, Essen, Halle, Posen, Rostock, Stein, and of iron in Atona, Braunschweig, Bremen, Cologne, Dusseldorf, Hamburg, Stuttgart, Zittau and other German cities.

† This is a very simple operation, it being only necessary to pass a weak solution of sulphuric acid through the pipes either before or after putting them down. It should, if possible, be left in contact with the pipe a few hours, then well washed out until the water becomes odorous and tasteless.—[Ed. IRON AGE.]

The water was analyzed in October, 1874, and then contained:

| | Mg. per liter. | Grains per gallon. |
|-------------------------|----------------|--------------------|
| Chlorine | 61 | 3·55 |
| Sulphuric acid | 125 | 7·29 |
| Nitric acid | 38 | 2·22 |
| Organic matter | trace | trace |
| Lime | 94 | 5·48 |
| Magnesia | 265 | 15·45 |
| Precipitated by boiling | 45 | 2·62 |
| Carbonate of lime | 257 | 14·94 |
| Carbonate magnesia | 5 | 0·29 |
| Total hardness | 328 | |

iron. Kersting found that iron is most strongly attacked by river water and ammoniacal distilled water, and scarcely at all by water containing carbonate of soda. A. Wagner conclusively shows that iron rusts twice as fast in water containing carbonic acid and oxygen as in water free from carbonic acid, that chlorides hasten the rusting and substances of an alkaline reaction retard it.

Fournet is of the opinion that the above mentioned protuberances are formed out of the water itself, from which, owing to a loss of carbonic acid, the oxide of iron is precipitated, which then gradually attacks the iron itself. Hence their formation could be prevented by avoiding any loss of carbonic acid in the pipes. As long as this rusting of iron water pipes and the formation of these lumps remain so little understood, it is most pressingly recommended to protect the pipes with a coating. Some lay the pipes in a thin milk of lime and then expose them to the air, and so form a film of carbonate of lime. Vieat had the pipes covered with hydraulic mortar, Engelhardt with cement, and Lake with cement or glass. Junker treats the pipes, under pressure, with linseed oil boiled with litharge; while Mercer, on the other hand, warns us against the use of any lead paint, as iron is then more strongly attacked than it otherwise would be. Pleischel recommended to coat the water pipes of Vienna with varnish, kind not specified. Strange to say, they are put down there without any protecting coating whatever.

It has been well known for a long time that iron may be protected by a coat of coal tar. Mallet showed that iron is best protected against the action of sea water by tar put on hot. This was employed by Kirchweger in 1847 on water pipes laid in Hanover. Smith warmed the pipes after cleaning off the rust, and immersed them in tar thickened with linseed oil and heated to 300° F. Tar is employed in a similar manner in Frankfort, Pesth, Brunn, etc. Everywhere the process works well.

For some time past cast iron pipes have been enameled, and recently, Wittenhaus, of Vienna, has covered iron service pipes with an elastic enamel. The results of experience with such pipes are wanting.

It may here be remarked that the stopping up above mentioned can sometimes be removed by acids, but, of course, the pipes themselves may be attacked thereby. The method of cleaning the water pipes in Andernach is original, but barbaric. It has been the custom there since ancient times to have this work done by living eels,* which are put into the pipes at the reservoirs, and which come to light again at the outflow, fayed and crushed. They break loose the cubes formed in lead pipes, as well as the accumulations of sand, small pebbles, etc., and aid in floating them out.

The Chinese in San Francisco.

If the civil authorities of San Francisco, and other cities on the Pacific slope, had performed their duties in a prompt and efficient manner, instead of trying to make political capital out of "the Chinese Question," that disturbing problem of pot-house and bar-room statesmanship would no longer agitate the public mind. In the comparatively small area of ten squares in San Francisco, there are at least 25,000 Mongols, who at night are packed together as closely as Eleme figs in a box. Hundreds of the tenements crowded to suffocation by them have neither ventilation, drainage, nor sunlight, and would be in any other climate the certain generators of a festering corruption that would spread pestilence and death throughout the community. This immunity from contagion should not be allowed to foster a false sense of security. A rigid enforcement of health laws would correct many of the worst evils of Chinese immigration, and perhaps no measure could be adopted which would more effectually discourage it as to compel them to live like human beings, and observe the proprieties of civilization. In discussing this question the San Francisco *Commercial Herald* says: Their mode of life render them now a seething mass of corruption, liable at any time to become a virulent pestilence, and there can be no validity to a claim which gives them the right to maintain in our midst a standing menace to the health and lives of our people. These continual anti-Chinese gatherings, these legislative inquisitions, these never ending newspaper diatribes, these ceaseless efforts to make the subject a stepping stone to political promotion, and these daily announcements of how many are here, how many on the way, and how many more China is capable of launching upon us, are all "leather and prunella." So far there has been nothing more serious than vain gabbling. Nothing whatever has been done to make the Chinese amenable to our laws instead of those of the Chinese six companies. Nothing has been suggested of a practical character within our reach, and nothing proposed by which the nuisance can be abated in conformity with law. Neither the Burlingame treaty nor any other instrument compels us to suffer the existence in our midst of the Chinese in a condition which imperils, not only the health and lives of other residents, but the value of property and the reputation we enjoy as a city of extraordinary exemption from pestilence of all sorts.

An explorer for Roman antiquities tells the *Athenaeum* how in 1873 he had a sewer examined, and in the course of a few minutes there were found a pugilare (writing table) in carved ivory of the third century, a bracelet cut out of jet from the Lybian River Gagis, three amphores (flasks) of glass, a gold ear ring, seventeen coins of the largest size, "and a slight touch of typhoid fever."

* In the summer of 1874 an eel weighing 3½ lbs., and 9 ft. 8 in. long, was taken alive from a Croton hydrant in Third avenue, near Fifty-third street, New York.

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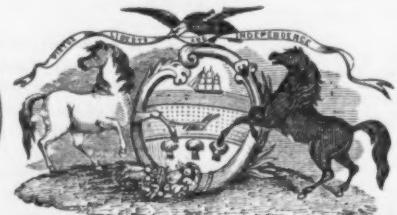
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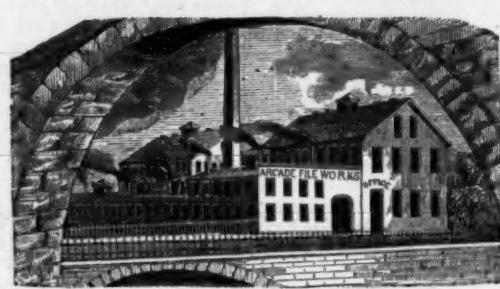
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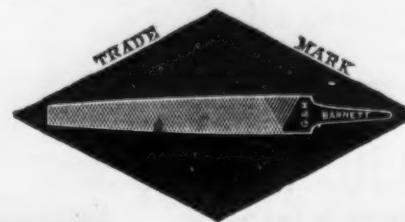
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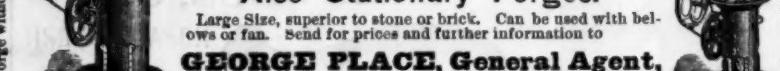
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Large Size, superior to stone or brick. Can be used with bellows or fan. Send for prices and further information to
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MANUFACTURERS OF

Pat. Wooden Articles.

We make a specialty of

WALNUT and ASH WAINSCOTING,
STEP LADDERS,

EXTENSION LADDERS,

Clothes Horses, Rat Traps,

TOWEL ROLLERS, &c.,

AND HAVE THE

Best Facilities for the manufacture of Straight
and Irregular Turned Work.



LOVELL'S
Automatic Lock Hinge
STEP LADDER.

The Best and Cheapest in
the World.

The following is a partial list of the Jobbing Houses that keep our goods in stock:

Pratt & Co. Buffalo, N. Y. Amer. Plow Co. Boston, Mass. Thos. Holliday & Co., Cincinnati, O. C. H. Walbridge & Co. " W. H. Banks Co. Chicago, Ill. W. P. Kurts & Co. " John H. Hill. Rochester, " David Landrath & Son, Phila., Pa. McIntosh, Good & Co., Cleveland, O. L. L. Thurwachter, Syracuse, " Griffith & Page. " Bingham & Williamson. " S. & P. Templeton, Albany, " Foe & Breed. Toledo, O. E. A. Burrows & Co., Troy, " J. Seth Hopkins & Co. " Ketcham & Voit. " Lindsey, Sterrett & Co., Pittsb'rgh, Pa. Jno. H. Thomas & Co., Louisville, Ky. Buhl, Ducharme & Co., Detroit, Mich. Morrison Bros. & Co., Hamilton Ont.

Pressed Wood Knobs for Machinery Hall, Centennial Exhibition.

We show in the accompanying illustration, one of the wood door knobs made for Machinery Hall, Centennial Exhibition, by the Ornamental Wood Company, of Bridgeport, Conn. These knobs, which are used throughout the building, were designed for the purpose by the Commission. They are made of solid white holly wood, pressed into shape in steel dies, and mounted with bronze trimmings. They are beautifully finished, and are in all respects interesting and creditable as specimens of the product of a promising, and comparatively new, industry. The design consists of a star in the center of which are the figures 1776.

During the past few years the manufacture of ornamental wood work, by stamping and pressing, has made rapid progress, and articles of this kind have steadily grown in popular favor. Very beautiful work can be produced at a cost merely nominal, as compared with that of carving, and stamped wood ornaments are applicable to a great variety of uses in connection with cabinet and carpenter work.

Cleveland Rolling Mill Products at the Centennial.

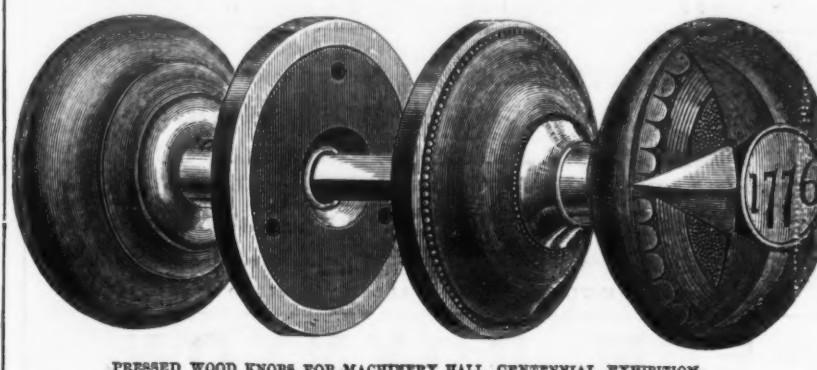
The exhibits of the Cleveland (Ohio) Rolling Mill Co. at the Centennial contain many features of novelty and interest. The wire department is represented by the contents of 15 cases, which will contain every possible style, variety and quality of wire, one case alone containing 60 different kinds, from the coarsest to the finest, some drawn to the diameter of a

SOME OF THE ADVANTAGES OF THE METAL AND SHOE.—The bars from which the continuous calked concave steel shoe are made, are now rolled, have a thin internal web, with a narrow projection on its outer edge of even thickness—the narrow projection, when the shoe is turned, forming a continuous calk, in which is the nail groove. The width of the top of the bar is a little greater than the width of the common plain iron shoe, and with the projecting ridge embraces the principle of corrugation, and while being stronger and stiffer, on account of the form of bar and material (steel), weighs fully a quarter less than common shoes of same size.

Admits of being nailed around the toe, where the shell of the hoof is thicker than any other part, and of course requires less nails at the heels or quarters, leaving this part of the foot free, neither being crowded in or out by being confined to a rigid bar of metal; therefore free to expand by pressure, and prevent contraction by confinement.

Admits of the frog, which in some respects is the most important organ of the foot, coming more readily in contact with the ground, thereby absorbing the requisite moisture, and receiving the pressure required to keep it in healthy condition and soft, as nature intended, in order that it might act as an elastic cushion to receive in part the force of the blow, and prevent injury to the internal organs of the foot and the whole system, when traveling on hard surfaced roads.

Prevents the slipping of the foot, either back or sideways, on any soil, when traveling, and with the same muscular power a horse will



PRESSED WOOD KNOBS FOR MACHINERY HALL, CENTENNIAL EXHIBITION.

hair, and so pliable as to admit of being used as thread. Another case contains a pyramid 5 feet in height, composed of coils of different sizes and qualities. One of the curiosities in this department is a long strand drawn into the shape of a carriage whip, seven-eighths of an inch in diameter at the butt, and tapering to almost impalpable fineness. Iron, steel, copper, brass and silver wire make up the list; drawn, square, oval, round, twisted, hollow and three-cornered in shape. This display is certainly one of the finest that it is possible to make in this line. The cases in which the samples are shown are very handsome, and the general tasty arrangement reflects much credit upon the designer.

The display in the other departments is equally as good, although not so attractive. There are, among other things, three pieces of Bessemer rail, each 7 feet long, taken from a promising lot, and each twisted four complete turns without causing a flaw or break of any kind in the metal. These pieces were twisted cold.

One of the most novel and telling features of the display is in the shape of a steel rail which was laid on the Lake Shore Road over six years ago, and has been in constant service during all that time. The rail is in fair condition, and would do still further service.

Numerous specimens of Siemens-Martin steel and boiler plate, bent in every conceivable shape to show the quality and tenacity of the metal, are included in the lot; also, a great variety of forgings, consisting of points and heel points, crank pins, spindles, etc. A bar of Bessemer horse shoe steel, grooved and prepared for cutting and forming, has eight twists in its length of 2 feet, and shows no sign of flaw or weakness in any part. A 3-rail bloom of Bessemer steel completes the lot. This bloom is 7½ inches square, and has been cut off by the shears at one end and broken at the other.

By all tests and experience in the use of this metal, its great superiority has been fully established. In the sale of several thousand tons of these shapes in various sections of the country, they have given universal and entire satisfaction.

The shapes or bars are now manufactured in eight sizes and put up in bundles of about 100 pounds, 10 to 12 feet long.

Bessemer Steel Horse Shoes.

The Cleveland Rolling Mill Company, Cleveland, Ohio, have recently added to their extensive works the manufacture of Bessemer steel



continuous calked horse shoes. The following illustrations show the sectional forms of two sizes of the bar, of which eight different

sizes are made. The company are anxious that all interested in improvements in horse shoes should examine these goods for themselves, and give them a fair trial. We have seen testimonials from proprietors of omnibus lines and street railroads, who have had these shoes in use, which speak in very flattering terms regarding their durability and the general satisfaction which they have given. We take the following from a circular issued by the manufacturers:

The Black Hills.—The evidence showing that the Black Hills are not the land of wealth and promise which they are commonly considered, is now conclusive. There is gold there, but the getting of that gold is attended with more labor and expense than it is worth, and fraud and exaggeration characterize all the reports affecting the Hills, that have been put in circulation by the merchants, tavern keepers and transportation companies of the frontier towns, notably of Cheyenne. Colonel C. Carpenter, who recently led an "expedition" 150 strong from St. Louis, and found his following increased to 400 at Omaha by accessions from Chicago and Kansas, has withdrawn from the enterprise and given a gloomy account of his experience. He reports extortion everywhere, from the railroad conductors who tried to charge passengers 50 cents extra for carrying robes, to the freighters at Cheyenne, who, instead of carrying goods and baggage to the Hills for three cents a pound, as they had contracted to do, charged eight. The Cheyenne route, too—as Colonel C. Carpenter should have known before setting out—requires 180 miles more of railroad travel and 80 miles more of teaming, than that of Sydney, which he prefers, but which is likely to prove even less eligible than the Sioux City road. It may not be amiss to add that Mr. Edwin A. Curley, who was sent to this country by the London Field as a special commissioner, and just fled his opinion of his field as being practical and just volume on Nebraska, is now in the Hills, and will soon report upon the subject. Whatever he may say will be entitled to confidence and respect, which is more than can be said of the sensational publications inspired by the greed of gain.

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BAND SAWS. TOOLS FOR BRAZING, &c.
Bed Screws, Pin Hinges, and Wire Nails a Specialty.

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CIRCULARS, CROSS-CUTS, MILL, MULAY, GANG, HAND, & BUTCHER.
Molding and Planing Knives, Plastering Trowels, Mitering Rods, &c.

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E. C. ATKINS. ESTABLISHED 1857. H. KNIPPENBERG.
E. C. ATKINS & CO., Indianapolis, Ind.
Saw Manufacturers and Repairers.
Sole manufacturers of the celebrated
GENUINE SILVER STEEL DIAMOND X CUT SAW.

\$1.50 Per Foot.  Patent Secured
GAUGING THE CLEARANCE.
PATENT HANDLES AND GAUGE INCLUDED.

BEWARE OF THE IMITATION CALLED "DIAMOND TOOTH."

E. M. BOYNTON,
Manufacturer of
All kinds of First-Class Saws,
Saw Frames, Cross-Cut Handles, &c.
Also, Sole Proprietor and Manufacturer of
LIGHTNING SAWS.

I have received from the agent of this celebrated Steel the following:

NEW YORK, February 26th, 1876.
E. M. Boynton, Esq., New York: DEAR SIR.—Your letter of to-day is at hand covering specification of 30,000 Cross Cut Plates. I beg to advise you that I accept your offer of the 11th inst. for 30,000 Cross Cut Plates of Thos. Firth & Son's make, "of the best quality they make" for that purpose, as warranted. THOS. FIRTH & SONS, per JERE. ABBOTT, Agent.

My Lightning Cross Cuts, made of Firth's Best Steel, will be furnished at 50c. per foot, and a reduction of 10 per cent. will be finally allowed to parties sending unsolicited cash orders during April, May and June, and maintaining prices. Champion and other varieties of Best Common Teeth Saws at 40c. per foot made of American Steel of excellent quality, warranted, with 5 per cent. discount for cash on receipt of goods.



My New Improved Double Edged Pruning Saw will cut as fast as Washington's little hatchet. Price per doz., \$7 for 18 inch. made of best steel, and guaranteed equal to any in the market. Ground 5 gauges on the back. Sample mailed on receipt of 75c.

Wheeler, Madden & Clemson
MFG. CO.,
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WARRANTED CAST STEEL
SAWS
Of every description, including
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PERFORATED CROSS-CUT SAWS
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Genuine Improved Patent
SCREW WRENCHES.

Manufactured by

L. COES & CO.,
Worcester, Mass.

Established in 1860.
TRADE MARK.
REGISTERED MAR. 23, 1868.

Registered March 23, 1874.



We invite the particular attention of the trade to our New Straight Bar Wrench, *widened*, full size of the larger part of the so called "reinforced or jog bar." Also our enlarged jaw, made with ribs on the inside, having a full bearing on the front of bar (see sectional view), making the jaw fully equal to any strain the bar may be subjected to.

These recent improvements in combination with the nut inside the ferrule firmly screwed up flush, against square, solid bearings (that cannot be forced out of place by use), verifies our claim that we are manufacturing the strongest Wrench in the market.

We would also call attention to the fact, that in 1869 we made several important improvements (secured by patent), on the old wrench previously manufactured by L. & A. G. Coes which were at once closely imitated and sold as the *Genuine* Wrench by certain parties who seem to rely upon our improvements to keep up their reputation as manufacturers, and although the fact of their imitating our goods may be good evidence that we manufacture a superior Wrench, we wish the trade may not be deceived on the question of originality. Trusting the trade will fully appreciate our recent efforts, both in improvements on the Wrench and in the adoption of a Trade Mark, we would caution them against imitations. None genuine unless stamped.

"L. COES & CO."

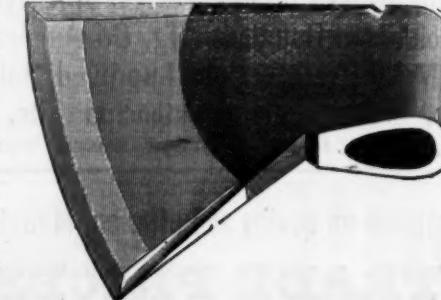
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Chief Engineer U. S. House of Representatives.

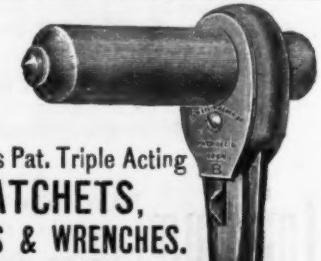
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These motors are adapted for driving light machinery, such as coffee mills, printing presses, drug mills, church organs, sausage cutters, ice cream makers, fans, etc., for pumping, hoisting machines and every thing requiring power in cities or towns where there are water works.

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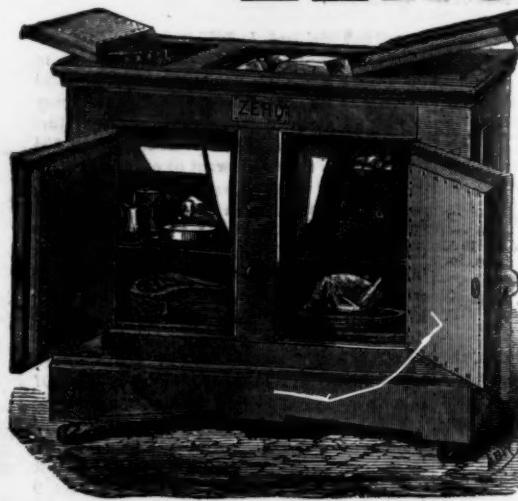
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Our new Patent Fancy Open Work Cap Butt, with Ornamented Knuckle, in Real and Imitation Bronze, and our Nickel Plated Cap Butts, with concealed Screws, are the handsomest in the market, and are attracting much attention. While making plain and japanned goods a specialty, we are prepared to meet the increasing demand for ornamented bronze and nickel plated House Trimmings. Goods packed in boxes or bundles, as may be preferred. For catalogue and price list address

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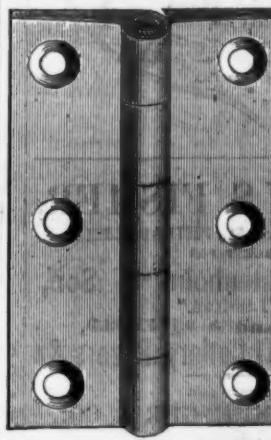
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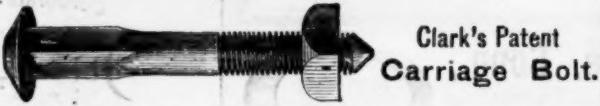
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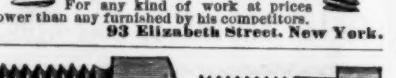
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TURNED MACHINE SCREWS.

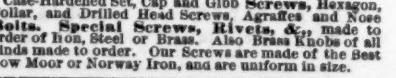
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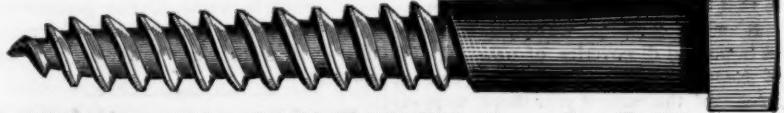
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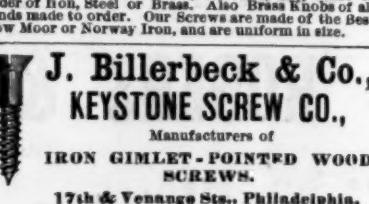
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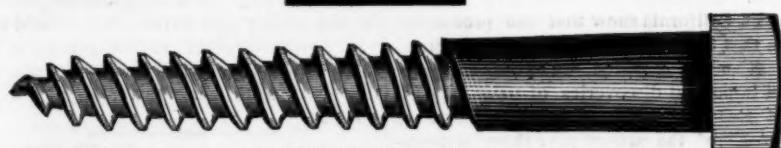
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New York Thursday, May 11, 1876.

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subscribers, and to return them to us if they find them
in hallways or upon stairs; and it is our desire and intention
to enforce this rule in every instance.

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Louis. Hardware and Metal Prices.

The Centennial and its Benefits.

As we go to press, we receive by mail and
telegraph reports of the ceremonies and
celebration attending the opening of our
Centennial Exhibition to the public. As
an account of the sights and scenes of the
day will be found in other columns, we do
not need to review them here.

Fortunately for us as a people, we have
no reason to apologize for the entertain-
ment to which we invite the nations of the
world. The work of the United States
Commission has been done vigorously,
and, although not fully completed, we can
say that it has been done well. Under the
able management of Director General Gos-
horn, the progress of the gigantic work of
preparation has been very uniform; and
when we consider the enormous and unex-
pected difficulties encountered by the Com-
mission in raising the money by public and
private subscription—difficulties which
would not have existed in times of

greater general prosperity—the fact that
the Exhibition is so nearly ready to open
at the time appointed, entitles it to rank
among the greatest productions of Ameri-
can enterprise.

It is too early to say whether the vast
outlay upon buildings, grounds, &c., will
be repaid. If not, we shall have no reason
to regret the venture. The incidental
benefits to result from the Exhibition will
so far exceed the sum of any possible
present profit which can be reaped from
the investment, that the latter becomes of
wholly secondary importance in the es-
timation of thinking men. We certainly
hope that none of the great expectations
which have been formed by those inter-
ested in the enterprise as subscribers, pro-
jectors or exhibitors, will be disappointed,
and we are quite certain that those which
are reasonable will not be. Industrial ex-
hibitions are of great benefit as public
educators. From this one we shall learn
something of the nature and breadth of the
foundations upon which rest our claims to
industrial and commercial greatness; by it
we shall see whether we have earned the
right to assume a place among the great
nations of the world. All sections of the
country will be brought into close sym-
pathy by a common pride in a great and
creditable display; local prejudices and
sectional jealousies will be softened by a
general commingling of all the elements
which have united to make the Ameri-
can people; the sluggish pulses of trade
will be quickened by the circulation of
hoarded millions; and we shall gain not a
little of healthy enthusiasm over our country
and our institutions by prolonging our
Fourth of July from the 10th of May to
the 10th of November. We have become a
little cynical of late. The great war and
its attendant train of inevitable evils—such as
reckless speculation, a lowering of the
standard of public and private morals, in-
flation, depression, the panic and resulting
paralysis in all departments of industry,
corruption in office, political demoraliza-
tion, &c.—have unsettled the confidence of
too many American citizens in the
benefits of free institutions. While we
wear blue spectacles we cannot be
expected to see clearly what exists about us.
No doubt there is a large class of intelligent
citizens who entertain very serious doubts as to
whether our republic is a success or a failure.
We are all very apt to have morbid fancies when
prices are going down and investigating
committees are poking about for corruption.
In a word, we are suffering as a nation
from a bad attack of doleful dumps, and
anything which will stir us up, make us
move about, give us something beside
ourselves and our business interests to
think about, and loosen the purse strings
of capital, will be a great blessing just
now. A general national holiday jollification
will be a good thing for everybody, and we
could not have it at a better time than this.
We earnestly advise all to go to Philadelphia
who can possibly get there; and, when there,
to stay as long as they can. They will come home with larger
ideas, with vastly increased knowledge,
and with a better opinion of America and
American institutions that can be formed
from observation and experience in the
limited sphere of one's daily work. We
need a revival of old-fashioned gushing,
self-assertive, confident patriotism. Love
of country and pride in its greatness are
nothing to be ashamed of, even though
they manifest themselves in ways which
cause foreigners to smile. If the
Centennial will help us to this it will be
well all it has cost us.

We cannot, however, limit the benefits
of the Centennial to its effects upon our
feelings alone. The material benefits
should be great, and probably will be.
Our manufacturers are beginning to ap-
preciate the vital importance of securing
foreign markets for their products. The
changes of the past three years which have
resulted in bringing down prices to, and in
some instances below, a gold basis, have
rendered manufacturing for export possi-
ble in competition with Great Britain and the
Continent. We have the skill, the machinery,
the materials, favorable conditions of soil,
climate, &c.; but we have so long been
excluded from participation in this
trade that in but few lines of manufacture
have we any large export business. Dur-
ing the past few years an effort
has been made to increase our for-
eign trade, and in some directions
with conspicuous and surprising success.
The Centennial will attract large num-
bers of foreign merchants, and afford op-
portunities for making ventures in foreign
markets which may be the beginnings
of a vast increase in our exports of
manufactures. The attendance from the
near-by foreign markets of Central and
South America and the West Indies will
probably be larger than from more remote
transatlantic countries, and as our principal
outlet for many years to come will be

those markets, our exhibiting manufac-
turers will do well to cultivate friendly
and business relations with such of our
Spanish speaking neighbors as may visit us.
It is probably true that, as a medium
for profitable advertising, more is ex-
pected of the Centennial than will be
realized. In depending upon its benefits
solely, many of our manufacturers are mak-
ing a great mistake; but a few weeks
will probably correct any false impres-
sions on this score, and we shall then
better understand than now wherein the
benefits of our great Exhibition will

method, and was always troublesome,
while the latter is much better and easier.
There is also another custom that had its
origin in the shipments of English iron to
this market, and that is the sale of Western
iron at any price in Eastern markets, with-
out reference to the card established either
East or West. We believe that the West
would willingly give this up if arrangements
could be made by which the associations
might work in harmony, and we believe
they can be. Iron masters, both East
and West, are getting sensible. The inde-
pendent feeling that was engendered by
the high prices and large profits of the years
preceding the war, has been toned down
by the losses of the past few months. A
man need not listen to reason when he is
making half a million a year, but reason's
voice will be very melodious when he
is not making a cent, but wants to. The
time for foolish pride is past. Old scores
must be wiped out, iron masters
must come together in a spirit of fa-
therness and concession, and the future will
be assured. There are some dealers we
know who do not wish this. They desire
the old times to continue so that the West
can unload East, and thereby enable them
to hold one section as a menace. We
misunderstand the present spirit of the
iron masters of the country if they lend
themselves to any such policy. Their
interests surely are identical, and if they
do not make them so in reality they
have less wisdom than we give them

Manufactured Iron—East and West.

During the past eight weeks the mer-
chant iron manufacturers west of the Al-
legheny Mountains have passed through a
test that, in its results, must be highly satis-
factory to them. Their tensile strength
may be stamped high. We have kept our
readers fully informed as to the tangible
results of the meetings that have been held,
including the one of last week, which
will be found reported in another place.
Their results may be summed up as includ-
ing the stoppage of the downward ten-
dency of iron; an advance in price; a re-
classification of iron; the fixing of a
charge for cutting iron to length; the
adoption of a system of discounts based on
the amounts of iron sold; a reduction in
the time for cash discounts from fifteen to
ten days; and the formation of an association
on a basis that will not only make these
results permanent, but will furnish the
necessary opportunity for such other
reforms in the future as the interests of the
trade may demand. We speak of the asso-
ciation as a fixed fact; for, although it is
not fully established, we do not believe
that it will fail. All of these movements
have been with an object in view—an ad-
vance in the selling price of iron—and they
have not failed of their purpose. Merchant
iron is selling in the West today at from \$5 to \$7 a ton advance over
the price which could be obtained for it on
the 1st of February. *

But beside these positive and tangible
results of the conferences of the Western
iron masters, there are other and indirect
results that will, in the end, be of even
greater benefit to the trade. The first of
these is the establishment of mutual con-
fidence. It is humiliating, but true, that
for months there has not been the least
confidence in any card or price, and scarcely
in any assertion which a manufacturer
would make as to prices. All this is now
changed, and it will be an extremely difficult
matter to convince a Western iron manufacturer
that any other Western iron manufacturer
is cutting prices. State that his neighbor is selling
at a tenth under the card, and in ninety-nine
cases out of a hundred, if not in the hundred,
he will reply "I don't believe it." This
confidence has resulted from investigations
that have been made of rumored cutting of
prices, and in every case they have been proven unfounded. As
we have often asserted, it is this want of
confidence that has demoralized the market,
and sent prices seeking a bottom and
finding none.

There is another incidental result of
these conferences that is full of comfort to
the seller of iron. Heretofore, when a buyer
would ask for quotations, an hour would
be spent in finding how much he wanted,
what sizes, what proportion of "sweetening,"
from whom he had received quotations, etc., and then the seller
was ready to quote prices. Now the answer
is, "The card rate; nothing less." The
number of years this will add to the
average seller's life we will not calculate.
But notwithstanding all that has been
done in the West, so far as the iron trade
of the country is concerned, the work is
but half done. The East is still at loose
ends. There is no understanding between
the two sections as to price, terms, etc., at
which each shall sell in the other's territory.
We believe that the time has come
when a change could be made with ad-
vantage. We are aware that there are old
sores and old jealousies in the way, but
those between the East and West are no
deeper nor uglier than those between dif-
ferent sections of the West. There were
Western mill owners who had not been
near an iron association meeting for
years, and now they are active members
of the new one. In our judgment,
it is possible for the East and West
to form associations on such a basis that
they can work in perfect harmony, having
a uniform card, selling by a uniform ton,
and respecting and maintaining the prices
each shall establish in its section. So far
as the card is concerned, the iron mer-
chants in and around New York have
helped this along by giving up the method
of selling by the gross ton, and adopting
the Western method of selling by the decimal
system of cents and tenths of cents per
pound. The former was the old English

The following figures show the quicksilver
movement in Great Britain:

| | 1876. | 1875. | 1875. |
|---------------------------------|-----------|-----------|---------|
| | Pounds. | Pounds. | Pounds. |
| Imports from Jan. 1 to March 31 | 1,251,639 | 1,104,522 | 979,980 |
| Exports | 549,431 | 208,892 | 576,080 |
| Quantity retained | 702,261 | 893,630 | 403,900 |

These English statistics, which are
brought down to a very recent date, show
that considerable quantities of quicksilver
have moved through Great Britain, the
bulk of which is received from Spain by
the Rothschilds. From London, most of
it finds its way back to the Continent.
The average monthly distribution of quicksilver
in Great Britain is usually set down
at 3500 flasks, or 267,750 lbs., for home
use and export. For the three months this<br

those competent to judge this work is considered one of the most practically valuable contributions to architectural literature that has appeared for a long time. The price of the work is \$8.

THE COAL TRADE: A Compendium of Valuable Information Relative to Coal Production, Prices, Transportation, &c. Frederick E. Saward, Editor of the *Coal Trade Journal*. Seventy-eight pages. Published at the *Coal Trade Journal* Office, 111 Broadway, New York.

This little annual has become very well known in all coal circles as a most convenient book of reference in coal matters. The present edition contains all the usual tables, corrected and brought down to date, together with a great variety of useful and interesting matter bearing upon the subject. The present number is illustrated by number of maps of various Coal regions. Foreign statistics of coal are given at great length, and in very good form for convenient reference.

CATALOGUE OF KEUFFEL & ESKEER, 111 Fulton street, N. Y. One hundred & twenty-three pages.

This is a photo-lithographic reproduction, quarter size, of their tenth edition catalogue. Each page has been reproduced by the Graphic Company, and the whole forms a miniature edition small enough to go into the vest pocket. It contains all the matter contained in the larger work. The cuts of the original being exceedingly fine and well printed have stood the reduction exceedingly well.

The Western Iron Meeting of May 3d.

The meeting of the Western Iron Association, held in Pittsburgh last week, was one of the most important in its results of any yet held. The greater portion of the time was occupied in considering the subjects of discounts to be made to large and small dealers, and a very radical change was agreed upon in the method of making the difference in price between these two classes of buyers. Heretofore the card has been fixed, and a base price established, below which it was agreed that iron could not be sold. It was left to each manufacturer's option as to the price he would make for even the smallest lots. The price has been based on what he could get, rather than on the size of the order. This is changed now. The card is the lowest selling price for lots in less than ten tons. For ten ton lots 1-10 cents per lb. discount is allowed. There are larger discounts allowed for 1000' tons, but these are not made public. The card, which we publish below, is the Pittsburgh card. At other points West the card is advanced by a sum corresponding very nearly to the freight from Pittsburgh to that point. For example, Cleveland would be 2-55, card.

The meeting developed a very firm and sanguine feeling among the manufacturers, and a universal determination to hold the market up to the point at which it now stands. The question of a deposit, to be used as a forfeit in case the depositing firm cuts under the stipulated rates, remains in *status quo*.

The subject of equalization of freights—or in other words, the right of a manufacturer to put iron into any point at the same price that any other manufacturer can reach that point, was not touched upon, that right being entirely conceded to all members of the Association without any dissent.

This meeting may be regarded as settling the future of the market for finished irons. The uniform determination of all the manufacturers that they will no longer cut their own and each others' throats at the same time, and the measures adopted for the maintenance of prices are assurances that, in the future, the iron market will be held at the present point, which affords a very moderate margin against loss.

Some of the largest Western jobbers were present in Pittsburgh during the session of the Association, and were in consultation with its members. There was a decided feeling on the part of the Association to make a fair and equitable card, one that should recognize the jobbers, and, at the same time, be just to itself, and we believe that the result will be to the advantage of both classes.

We expect now to see a much better demand than for the last few weeks. Western purchasers have been holding aloof, waiting to know that the Association was in earnest. They will now see that nothing further is to be gained, and orders will come in.

The following is the new Pittsburgh list of May 5th:

Flat Bar.

1 1/2 to 4 by 3/8 to 1 Inch..... 25
4 1/2 to 6 by 3/8 to 1..... 26
1 1/2 to 6 by 1 1/2 to 1 1/2..... 26
1 1/2 & 1 1/2 by 3/8 to 1 1/2..... 26
1 & 1 1/2 by 3/8 to 1 1/2..... 27
1/2 & 1/2 by 3/8 to 1 1/2..... 29

Rounds and Squares.

1 to 1 1/2..... 25
2 to 2 1/2..... 27
2 1/2 to 3 1/2..... 28
3 1/2 to 4..... 29
4 to 5 1/2..... 30
5 to 6 1/2..... 31
6 to 7 1/2..... 32
7 1/2 to 8 1/2..... 33
8 1/2 to 9 1/2..... 34
9 1/2 to 10 1/2..... 35
10 1/2 to 11 1/2..... 36
11 1/2 to 12 1/2..... 37

Horse Shoe.

All Sizes..... 35

Heavy Bands.

3 1/2 to 6 by 1/2 to 5-1/2 inch..... 27
3 1/2 to 6 by No. 12..... 30
1 1/2 to 2 1/2 by 3/8 to 3-1/2..... 28
1 1/2 to 3 1/2 by No. 11 and No. 12..... 31
1 to 1 1/2 by 3/8 to 3-1/2..... 32
1 to 1 1/2 by No. 11 and No. 12..... 34
1/2 & 1/2 by 3/8 to 3-1/2..... 35
1/2 & 1/2 by No. 11 and No. 12..... 37
3/4 & 3/4 by 3/8 to 3-1/2..... 40
3/4 & 3/4 by No. 11 and No. 12..... 42

Light Bands.

3 to 6 by 1/2 to 3-1/2..... 28
3 to 6 by No. 12..... 30
1 1/2 to 2 1/2 by 3/8 to 3-1/2..... 28
1 1/2 to 3 1/2 by No. 11 and No. 12..... 32
1 to 1 1/2 by 3/8 to 3-1/2..... 34
1/2 & 1/2 by 3/8 to 3-1/2..... 35
1/2 & 1/2 by No. 11 and No. 12..... 37
3/4 & 3/4 by 3/8 to 3-1/2..... 40
3/4 & 3/4 by No. 11 and No. 12..... 42

Hoop Iron.

| | |
|---------------------------------------------------------|----|
| 5/8 & 9-16, Nos. 13 to 16..... | 52 |
| 5/8 & 11-16, Nos. 13 to 16..... | 42 |
| 1 1/2 & 1 1/2, Nos. 13 to 15..... | 38 |
| 1 1/2 to 2, Nos. 13 to 15..... | 34 |
| 5/8 & 9-16, Nos. 17 to 20..... | 55 |
| 5/8 & 11-16, Nos. 17 to 20..... | 45 |
| 5/8 & 11-16, Nos. 17 to 20, for each gauge lighter..... | 41 |
| 1 1/2 & 1 1/2, Nos. 16 to 19..... | 36 |
| 2 1/2 & 3 1/2, Nos. 13 to 15..... | 35 |

The prices under Hoop Iron do not apply to Cottontown Ties.

10 cent per lb., extra will be charged for cutting to specified lengths.

Oval Iron.

| | |
|-------------------|----|
| 5/8 to 1 1/2..... | 29 |
| 5/8 to 2..... | 31 |
| 5/8 to 2 1/2..... | 33 |
| 5/8 to 3..... | 37 |

Half Oval and Half Round.

| | |
|------------------------|----|
| 5/8 to 1 1/2 inch..... | 32 |
| 5/8 to 2..... | 37 |
| 5/8 inch..... | 4 |

Wagon Box Iron, 3/4 and 1/2.

Extras for Cutting to Length all Proceeding from.

All Iron, including Tires..... 110c.

Tank Iron.

| | |
|--------------------------|----|
| 3-16, to 1/2 inch..... | 33 |
| Boiler Plate..... | 35 |
| Heads, not flanging..... | 5 |
| " flanging..... | 4 |
| Flow Slabs..... | 35 |
| " Wings..... | 38 |

Sheet Iron.

| | |
|-------------------|----|
| No. 10 to 14..... | 33 |
| " 15 to 17..... | 35 |
| " 18 to 21..... | 38 |
| " 22 to 24..... | 4 |
| " 25 and 26..... | 42 |
| " 27..... | 4 |
| " 28..... | 48 |

All Sheets No. 18 and lighter, over 30 inches wide, not less than 2-10 extra.

TERMS AND DISCOUNTS.

Less than 10 tons, full card rate.

For a 10-ton lot in one shipment, one-tenth off list.

Note or acceptance at sixty days, with current rate of exchange in New York; or a discount of two per cent. for cash, if remitted within ten days from date of invoice.

The Legal Status of Furnace Script.

The following correspondence, which will be of interest to furnace men, has been given to the public:

HOUSE OF REPRESENTATIVES, {
WASHINGTON, D. C., April 24, 1876. {

GENTLEMEN: I was so engaged with pressing duties when I received your letter, that it was wholly out of my power to give the subject about which you wrote me immediate attention; but I finally found time to look into the matter, and have introduced a bill on the subject.

On examining the law I could not see how the Commissioner of Internal Revenue could give it such a construction, hence I addressed him a note, enclosing him your letter and asking if he had given such a construction to the law.

He replied, inclosing me a letter that he had written in answer to a similar inquiry, from which it appears that Mr. Pratt, the present Commissioner, on a careful examination of the law has revised the former ruling on the subject. I inclose you both letters. I think you will find the last decision of Mr. Pratt gives the remedy you desire.

Very respectfully,
JNO. F. HOUSE.
MESSRS. SECHLER, McCULLOUGH & CO.

TREASURY DEPARTMENT,
OFFICE OF INTERNAL REVENUE, {
WASHINGTON, D. C., Apr. 22, 1876. {

SIR: I have the honor to acknowledge your letter of 21st Inst., enclosing letter of Sechler, McCullough & Co., of Vernon Furnace, Tenn., in respect to their liability on scrip issued by them, under Sec. 3408, Revised Statutes, and Sec. 19, act Feb. 8, 1875, the said scrip being payable in merchandise.

I return the communication of Sechler, McCullough & Co. herewith, as requested, I also inclose a copy of office letter of 22d ultimo, to Hon. C. H. Stinckson, M. C., regarding the liabilities of Wall, Pancoast & Craven, manufacturers, in a similar case, the ruling in which would seem to be equally applicable to the case you present.

Very respectfully,
D. PRATT, COM.

TREASURY DEPARTMENT,
OFFICE OF INTERNAL REVENUE,
WASHINGTON, D. C., Mar. 22, 1876.

SIR: I have the honor to acknowledge your letter without date, concerning the case of Wall, Pancoast & Craven. You write as follows: "Wall, Pancoast & Craven, glass manufacturers at Salem, W. J., employ in their business a large number of operatives. The margin in the manufacture of glass is very small, and almost the only profit in the business arises from the general store kept by the manufacturers. To facilitate the keeping of their accounts with said employees, which would consist of very many small items, and to dispense with a number of clerks which the passbook system would require, they deliver to each employee from time to time merchandise orders, one of which is above annexed, for the amount of their several wages contracted to be paid in merchandise. These orders, in their faces show, entitle the holder to goods at the store to the amount of one dollar, and if the holder does not wish to deal out all the order at once, he can get goods to the value of not less than five cents, or such amount under one dollar which will divide into and leave no remainder. The amount dealt out is then punched out, as shown above, which is only an easy way of receiving for such amount, and the order is good for goods at said store for the balance." It will thus be seen that these orders are not intended as a substitute for money, but are simply a system of keeping accounts. The greater proportion of them never leave the premises of the firm, but are carried at once from the office where they are delivered, to the store, to be at once dealt out. The employees receive them Saturday night at the close of their week's work, and take them at once to the store to get the necessities for their families. The balance of their wages are paid in money. A very small percentage of the orders pass out of the hands of the employees, other than to the store as aforesaid. They are never redeemed in money. The solid and insoluble particles of this new salt being added in a very delicate state to the water to be operated upon: The proportion in which this solution is to be added to the water, is determined by the degree of impurity characterizing the water; and the proportions suitable must therefore be determined by careful experiment practiced from time to time, if the impurity of the water is found to vary. The water to be purified may be run into a tank or reservoir, and the solution of neutral sulphate added as it runs in, so that the solution may be well mixed with the water. A short time after the neutral sulphate is added to the water it becomes decomposed, and forms, with some of the impurities contained in the water, a basic salt, which is insoluble in water. The solid and insoluble particles of this new salt are precipitated, and, together with the impurities contained in the water, form a sedimentary deposit, from which the purified water may be allowed to run off, leaving the deposit in the tank or reservoir. A repetition of this precipitating process on other bodies of water which may be run into the same tank or reservoir will cause additional deposits, which, when allowed to accumulate to a sufficient depth, may be collected and removed from the reservoir from time to time.

In a paper read before the American Academy of Science, at Washington, last week, Prof. Ellis, of F. R. S., of London. The instrument moves

I have again examined the question of liability in this case with care, and have concluded that so long as evidences of indebtedness of precisely this character are neither payable in money, nor redeemable in money, they are not liable as circulation.

See for possible criminal liability for the use of these evidences of indebtedness, Section 3583 R. S. Very respectfully,

D. D. PRATT, COM.

HON. C. H. SINICKSON, M. C.,
House of Representatives.

Section 3583 R. S. reads: "No person shall make, issue, circulate or pay out any note, check, memorandum, token or other obligation for a less sum than one dollar, intended to circulate as money or to be received or used in lieu of lawful money of the United States; and every person so offending shall be fined not more than five hundred dollars, or imprisoned not more than six months, or both, at the discretion of the Court."

Section 3408 and 3508 and Section 19 are familiar to all furnace men, and need not be copied here.

Scientific and Technical Notes.

Loomis, of Yale College, gave some interesting facts on

HIGH AND LOW BAROMETERS.

He said that in a large majority—say two thirds—of instances; if there is low barometer at a given point, high barometer is found at a locality to the southeast at a distance of about 1200 miles on this continent. Observations in Europe give the same result as to coincidence and direction, but the distance there is about 1700 miles. In both continents the high barometer is always associated with high temperature. Thus, when there is an area of low barometer in Alaska, there is one of high barometer, accompanied by cold, at about the middle of the United States; when there is low barometer in Iceland, there are records of high barometer and cold at Paris and Vienna. The physical connection between these areas of high and low barometer is a subject for hypothesis. In general there is a flow of

BUSINESS ITEMS.

MASSACHUSETTS.

The Knowles Steam Pump Works, Warren, find plenty of work for their 150 men.

A display of their seamless brass and copper tubing will be made at the Centennial by the Bridgewater Iron Company. The burnished tubing shown by them is arranged in an upright case, and resembles the front of a great organ.

Work has been resumed at E. A. Morse's stove polish manufactory, at Canton.

Five car loads of their rough plate glass have lately been shipped to California by the Lenox Plate Glass Company.

Though turning out 10,000 needles a day, the Domestic Needle Works, Middleborough, intend soon to double their product.

The foundries at Springfield are turning out work for 40 per cent. less than they did at the close of the war. There is no selling below cost, as has been stated, as labor generally is also lower, though many of the old trusty moulder get as much now as they used to. Freight on the railroad is so dull that the companies have little to do with foundries, which makes the iron business doubly dull.—*Republican*.

The Chipman Mine is the only one at Newbury in which successful work is going on still, but it is claimed that it has thus far been more productive, in proportion to the number of cubic feet of ground broken, than any mine on the Comstock Lode of Nevada. The main shaft is now down 185 feet, and from a ton and a half to four tons of ore is taken out daily.

The Boston Journal of Commerce of the 6th says that the property of the Wood & Light Machine Company, of Worcester, was advertised for sale at auction on Tuesday morning to satisfy the claims of mortgagees, but by order of William Dickinson, one of the chief mortgagees, was deferred until June 25 to give the old firm an opportunity to secure assistance and make arrangements for settling claims against them and continuing the business themselves. The property of the company, valued at some \$251,000, is now in the hands of the assignees. The indebtedness is some \$150,000, and there are mortgages of over \$100,000 on the property. The manufacturers of the corporation have gained a wide reputation, and there is a strong feeling in favor of keeping the business in Worcester. The company's sales last year amounted to \$120,000. A suggestion was made for the formation of a stock company to purchase the property, which, it was believed, could be bought for \$150,000, but the committee of the Worcester Board of Trade did not recommend such action, and the deferring of the auction sale is another expedient which believed will be successful in retaining and continuing the business in the city.

RHODE ISLAND.

No portion of Rhode Island will be better represented at the Centennial than Pawtucket. The following houses are to make exhibits: D. Goff & Son, case of braids; James M. Carpenter, taps and dies; Green & Daniels, thread; George S. Fales, thirty-inch double belt; Pawtucket Hair Cloth Co., samples of goods; R. I. Cardboard Co., samples; E. Jenckes & Co., ring travelers; Fales, Jenks & Sons, water meters, roving frames, spinning frames, &c.; R. Bliss Manufacturing Company, croquet sets, tool chests, tool handles, &c.; American File Company, three cases of goods; B. P. Clapp & Co. (for United States government), chemicals; H. L. Fairbrother & Co., display of belting and leather; Conant Thread Company, cases of thread; Union Wadding Company, fifteen styles of wadding; Charles A. Luther, cloth stretcher; Payne & Mathewson, upright cone winder.

The American Screw Company, of Providence, have begun the removal of a portion of their business to Dundas, Canada, having already shipped six car loads of machinery thither.

CONNECTICUT.

Kennedy's Screw Manufactory, at Hamden, was burned on the 29th ult.; loss \$33,000.

The Northfield Knife Company will make a fine display at the Centennial. Their show case, which was forwarded some time since, contains over eight hundred pocket knives, no two of which are alike. Some of them are only three-fourths of an inch in length when open.

NEW YORK.

The Photo Engraving Company, of this city, have been compelled by the increase in their business, to remove from the premises they have occupied for four years past, at No. 62 Cortlandt street, to larger and more commodious quarters at No. 67 Park Place. With about three times the room they formerly had, and proportionally increased facilities, they will be able to turn out work more expeditiously and to much better advantage than hitherto, and will doubtless maintain and extend the reputation they have established in their comparatively new branch of art.

NEW JERSEY.

There are 16 rolling mills and 18 blast furnaces in New Jersey. Of the former 8 are running, and of the latter 11 are in blast, and 2 out of the 4 bloomaries are idle.

The mill at Oxford was built in 1866, has 25 puddling and 6 heating furnaces, 4 spike furnaces, 80 nail machines and 4 trains of rolls; one 10, one 12, and two 23 inch. The product is merchant bar, spike rods, nails, railroad spikes, fish joints, nuts and bolts. The yearly capacity is 16,000 tons, and for the last eight or nine years, it is stated, it has been turning out 15,000 tons of finished iron. The two blast furnaces turn out 17,000 tons of pig iron per year.

There are two rolling mills in Paterson. Collins' Iron Works has been idle for the last two years, and the Passaic Mill has been on double turn. This mill has the name of turning out the largest beams in this country. It

was built in 1867, and has eight double puddling and five heating furnaces; three trains of rolls and one hammer. The product is beams, channels, angles, tees and other shapes for buildings and bridges, merchant bars, rivets, nuts, etc. The annual capacity is 12,000 tons.

PENNSYLVANIA.

The Cambria Works, of Johnstown, will send to the Centennial a pyramid 33 feet at the base and 16 feet in height, with a width of 10 feet, made of specimens of fluxes, pig iron, spiegel, furnace balls, puddled blooms, twisted rails, etc., being a compendious illustration of the facilities of Pennsylvania iron works.

Since the first of December last, Wallace & Sons, at Sheridan, have manufactured and sold over 500 of their plows.

The report that the Newmarket Forge, at Ainsville, was to be put in operation at once is premature.

Messrs. Painter & Son have received a large contract for furnishing Leinbach's Mill, at Myerstown, with new machinery. This order will necessitate Messrs. Painter's employing a large force of workmen.

Seeing a notice of a very large pump recently put in operation at one of the Philadelphia Coal Company's collieries, a Bethlehem paper thus relieves itself: This is only a baby pump, when compared with that of the Lehigh Zinc Company, near Bethlehem, known as the "President." The President is a vertical condensing engine, 10 foot stroke, with a cylinder of cast iron, 110 inches in diameter. The total weight of the cylinder, with its head and bottom, is 40 tons. The piston rod is fastened to the cross head by a steel nut weighing 1100 pounds. There are two fly-wheels, each 35 feet in diameter, and each weighing 92 tons. The walking beam is in four parts, and weighs in all 95 tons; it gives motion to four plungers and four lift pumps, raising 17,000 gallons of water per minute from a depth of 220 feet. Sixteen boilers are connected with this engine. To be fully appreciated, this steam pump must be seen. Does Schuykill think they have any big pump up that way? The President is 3200 horse-power. The world is invited to come and look at this baby as they go by to the Centennial.

The large hoisting engine which has been in the course of erection at Pardee & Co.'s mines, Hazleton, is complete, and was set in motion last Friday. This is supposed to be the largest that is in use at any coal works in the State. It is 750 horse-power, 6 feet stroke, with 32 inch cylinder. The hoisting drum attached to this machine measures 16 feet 4 inches in diameter. This engine was turned out at the Lehigh Valley Railroad shops at Weatherly, and is a complete piece of workmanship.—*Hazleton Sentinel*.

Messrs. Mellert & Co., of the West Reading Foundry and Machine Shop, are running full on orders for pipe. They are filling an order for the city of Philadelphia for 7500 pieces of six-inch pipe, each 12 feet long; 100 pieces of eight-inch pipe, each 12 feet 4 inches long; 100 pieces 10 inch pipe, each 12 feet 4 inches long, and 100 pieces of 12 inch the same length as the last mentioned. Mellert & Co. furnished last year all the pipe that was laid in and around the Centennial grounds, consisting of 12 and 10 inch pipe, all of which was placed in position during last fall and winter. This firm has been awarded the contract for the pipe for the city of Reading, amounting to 12,000 feet. They are also manufacturing 10,000 feet of 10 inch water pipe for the city of Wilkes Barre, which is being rapidly delivered. The new pipe mill on Grape street is kept constantly engaged upon the largest dimensions of water pipe, and this addition to Mellert & Co.'s establishment has given them double the capacity and facilities for turning out work rapidly, which they formerly possessed.

PITTSBURGH AND VICINITY.

The report that gained currency last week, to the effect that Zug's Mill would start on last Monday, was without the least foundation. There is no present intention on the part of the committee of creditors who have it in charge to start it.

The use of "hot fix" is almost a thing of the past in this section. For making certain grades of iron it is still used at Lloyd's, Brown's and Stig.

Miller, Metcalf & Parkin are putting up a building for their new sheet mill mentioned in these columns a few weeks since. The Key stone Bridge Co. are doing the work.

Porter, Bell & Co., manufacturers of light locomotives, began working 10 hours on Monday.

Work has been begun on the second stack at the Lucy Furnace, and it will be pressed rapidly to completion. It will be the same size as No. 1, 75x20, and will for the present be used only in case No. 1 is blown out, when it will be run with the same equipment. The only new construction beside the stack will be a cast house. In lining, 30 inch brick will be used, the same that is being used in No. 2 Isabella.

Dom. Pedro favored the Snook City with a call Saturday, visiting the iron and glass works.

The Lucy is now running continuously on Bessemer, having found a remedy for the building out of the furnace heretofore experienced. She is making from 90 to 96 tons per day.

No. 2 Isabella is nearly refined. It is the intention to blow both stacks, and make, on an average, 100 tons per week.

Some trouble has been experienced with the gas the past week, water having got into the well and drowned it out.

SHENANGO VALLEY.

The Westerman Iron Co. have begun the manufacture of chains at their mill in Sharon. They already have eight fires in operation and are building ten more, and propose putting in altogether. Each fire will turn out about 150 lbs. of chain a day.

The Sharon Herald reports concerning iron

matters in that town as follows: Keel Ridge Furnace, Kimberly, Carnes & Co., averaged 34 tons per day of No. 1 iron last week. Westerman No. 2 is working handsomely, and is making 34 tons per day of clear gray foundry iron. No. 1 is being repaired and refitted in the most complete manner, but just when it will blow in we are not informed. Stewart Iron Co.'s Furnace No. 1 is doing handsome work, making some days as high as 40 tons, and averaging from 35 to 36 tons per day. The Ormsby Furnace, Kimberly, Carnes & Co., made, during the month of April, 11645 tons of an excellent quality of iron.

MARYLAND.

The Cumberland News states that the puddling mills of the Baltimore and Ohio Railroad started up yesterday morning, and all other mills connected with the same will start up on Monday, the 8th inst.

WEST VIRGINIA.

The Clifton Iron and Nail Works were bought on the 27th ult. by W. P. Rathburn, George E. Downing and H. H. Swallow. Mr. Downing and Swallow were connected with the old company, and Mr. Rathburn is a banker at Chattanooga, Tenn., and connected with the Roane Iron Company. It is the intention of the new company to at once start up the works.

The Moundsville Rolling Mill was in operation last week.

The Belmont Furnace started up again last Thursday.

At the close of the day turn, yesterday, the boilers of the Top Mill, Wheeling, about 56 in number, notified the proprietors that they were "out on a strike." The strike was inaugurated for the purpose of getting more fine ore, as the boilers claim that with fine ore their work is made much easier. However, we understand that the Top Mill boilers get the same amount of fine ore as the boilers elsewhere. There is enough iron on hand to last the nail factory for six weeks to come, and as there is quite a large quantity of nails on hand, we opine that the boilers will find that they have made a mistake in striking just at this time.—*Intelligencer*, 6th.

OHIO.

The King Iron Bridge Company, Cleveland, is one of the most extensive works of the kind in the West. Their shops, located on St. Clair street, in the eastern part of the city, cover an area of 94,000 square feet, the capacity being equal to the production of 40,000 linear feet of work per annum, valued fully at \$15,000,000. They employ on an average 250 hands on a monthly pay roll equal to \$11,000. They have put up bridges in every state of the Union. In 1875 they manufactured and shipped 23,045 linear feet of wrought iron bridges.—*Trade Review*.

The difficulty between the Co-operative Stove Company, Cleveland, and their molders, which grew out of a demand made by the molders for the discharge of non-union men, is about at an end. Thirty-seven non-union men are now employed in place of so many striking union men, and more are applying, but the company do not care at present to enlarge the force. They expect, however, to start up full within a few weeks, and anticipate no difficulty in getting molders. About 70 molders struck.

The Advocate says: The Cleveland Rolling Mill Company's new wire mill and annealing house is being vigorously pushed forward. The walls of the annealing house are almost up. This building is 75 by 123 feet, two stories high, and built of brick, with stone foundation. The rafters and beams will be iron; the roof covered with slate. The old annealing house will be connected with the new one by a covered-in bridge across Wire street. The bridge will be about 70 feet long. The wire mill's foundation walls are already laid. This, we learn, will be 115 by 48 feet, and might more properly be called an extension to the mill recently erected. The end wall of that will be torn down, thus making it over twice the size and giving it more than double its former capacity. It will also be carried three stories high in unison.

The double Siemens-Martin furnaces of the Cleveland Rolling Mill Company are now running double turn, full capacity.

The Co-operative Stove Company have leased the Franklin Company's foundry, Cleveland, for three years from April 1st. This addition to their already extensive works about trebles their capacity. They are now using this foundry, their other works being temporarily idle. The Franklin Company will let out their work as required.

The Akron Steam Forge is in operation again after a few weeks' idleness.

The Eagle Iron Fence Company, Akron, are removing their works to Pittsburgh, Pa.

C. Aultman & Co., of Canton, are going to send a Buckeye mower and reaper agent to Norway.

The assignee of Diebold, Norris & Co., Canton, offered the property for sale last week without getting any bids.

The Girard Wrench Factory last week received an order for a quantity of wrenches from a hardware dealer in England.

The Advocate says of the wire whips that constitute a portion of the Cleveland Rolling Mill Company's Centennial display: These are drawn from a seven-eights inch rod, and reduced in size every four inches until it reaches nine feet in length, thence it is reduced by forty-three drafts or pulls—all from the same rod—until it reaches fourteen and a half feet long. It will be seen that this wire starts with seven-eighths inch and finishes with No. 50—wire as fine as a hair on the human head.

The Akron Steam Forge is: The bosses of the old and new rod mills seem to be striving who can turn out the largest quantity of No. 4 Bessemer steel rods in a single turn. Thus far the old mill carries off the laurels. The other evening the old rod mill eclipsed all its previous efforts, and superseded the new rod mill by 235 pounds in a single turn.

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The Pomeroy Iron Company has been making large shipments of manufactured iron to the West. They sent about 50 tons to St. Louis in the last two weeks.

MAHONING VALLEY.

The Vindicator says: Both of Brown, Bonnell & Co.'s rolling mills are running double turn. Their nail mill is running full time. This firm is shipping over 100 tons of iron and nails per day. Their boilers cannot keep the mills supplied, and they are gathering scrap from their yards.

The Himrod Furnaces, stacks Nos. 1 and 2, are in blast. No. 1 is running on Bessemer, and making nearly 50 tons per day. No. 2 is running on mill and foundry, and making about 30 tons per day. Stack No. 3 is not in blast, and will have to be rebuilt, at least the greater portion of it. No. 3 will not be in blast for at least two months.

The Pennsylvania Railroad Company is loading a train per day with cinder at Brown, Bonnell & Co.'s mill, and using it for ballast on the road, it being excellent for that purpose.

TENNESSEE.

The Commercial, Chattanooga, has the following relative to the prospects in that section: If the signs of the times, relating to the business in this section, are not healthy then we are not skilled in the observation of business signs. The contracts for this end of the Cincinnati Southern are about to be let; the Roane Iron Company has work enough to keep it busy with a full force all summer; the Wason Car Company are working a full force; Scofield is making arrangements to complete his mill; the English Company, at Battle Creek, are spending money freely for improvements; the river trade is lively, the streets are crowded and silver is getting common. The Roane Iron Company now have about 500 men employed here, and are running night and day. They have a contract, now about half completed, to furnish 4500 tons of rails to the Little Rock and Fort Smith Railroad. They are also doing a good deal of work for the East Tennessee, Virginia and Georgia, Memphis and Charleston, Mobile and Montgomery, Montgomery and Eufaula, Western and Georgia Central Railroads. Chattanooga will make her iron go far toward threading the globe.

KENTUCKY.

The Louisville Rolling Mill is running single turn, and will probably be in operation the entire month. The Kentucky Mill is stopped for repairs, and taking stock.

Upright Two-Cylinder Blowing Engine at Pribram, Austria.

There were in use at the Pribram Furnace up to the year 1873 two blowing engines—one driven by water power, with a capacity of 126-3 cubic meters per minute; the other, a steam horizontal engine of 126-3 cubic meters capacity. As the former, from lack of water, was idle a greater portion of the time, and the latter was unable alone to meet the increased demand made upon it, it became necessary to erect a second steam blowing engine of sufficient capacity to blow the furnace alone.

This engine is calculated to deliver 252-6 cubic meters of air per minute, at a pressure of 65 mm. mercury. The form decided upon was that of the upright or vertical beam engine on the compound or Woolf principle. In order not to make the cylinders too large, they are made double, and two walking beams are employed. The Woolf or compound engine is of 70 horse-power, with both cylinders connected directly to the end of one of the walking beams. Power is transferred to the other walking beam and blowing cylinder through the crank shaft, on the middle of which there is the usual fly-wheel.

The steam cylinders are placed side by side as near together as possible, and in line with the walking beam. The high pressure cylinder being next the beam center, the low pressure cylinder outside of both, the end of the beam being turned up considerably above the point at which the low pressure piston rod links are connected. The low pressure cylinder is 797 mm. in diameter and has 1580 mm. stroke. The high pressure cylinder is 474 mm. diameter, with 1132 mm. stroke. Both cylinders have jackets supplied with live steam. Radiation from these is prevented by a non-conducting coating outside of which is placed wooden lagging. Ordinary slide valves are used, which are driven by eccentricities on a shaft set at right angles to the main shaft from which it is driven by bevel gearing. A Meyer expansion regulator is used on the high pressure cylinder. It will be understood that the two walking beams are side by side a short distance from each other. The condenser occupies a place beneath the end of the second or driven beam similar to that occupied by the low pressure cylinder under the end of the first beam. Inside, or next the beam

THE CENTENNIAL EXHIBITION.

The Opening Ceremonies.—The Attendance.—Present Appearance of the Various Departments.

Yesterday morning at 9 o'clock the Centennial Exhibition was opened to the public with simple but impressive ceremonies. The attendance was enormous. From the moment the gates were opened until far into the afternoon there was a steady inflowing stream at the gates, until a large part of the vast enclosure was black with people.

In preparation for an unfavorable morning the Centennial authorities announced that in case of severe rain the ceremonies would be held in the Main Building. The chorus and orchestra were to arrange themselves below the organ in the transept; the President of the United States would come to the circle at the intersection of the great avenue, and the invited guests would take places along the great central avenue of the nave, corresponding as nearly as possible to the assigned positions on the platform. But fortune favored, and the sun shone out bright and warm by 9 o'clock.

By 10 o'clock there were fully 50,000 people on the grounds, and at the close probably twice as many.

At 10:55 a.m. the President entered through Memorial Hall, and was conducted to a seat on the front of the platform. Governor Hartranft, General Hawley and D. J. Morrell occupied seats on his left, while Messrs. John Welsh and Goshorn were on his right. Considerable amusement was caused by the sudden appearance of Frederick Douglass, who had in some way worked his way through the crowd, and was helped over the ropes by officers and conducted to a seat on the platform. He was greeted with cheers.

At 11:03 a.m. the Wagner Centennial Inauguration March was performed by the orchestra under the direction of Theodore Thomas.

BISHOP SIMPSON'S PRAYER.

Bishop Simpson, of the Methodist Episcopal Church, was then called upon, and opened the ceremonies with an impressive prayer very appropriate to the occasion. We quote the following sublime invocation:

"May the new century be better than the past, more radiant with the light of true philosophy, warmer with the emanations of a world-wide sympathy. May capital, genius and labor be freed from all antagonism by the establishment and application of such principles of justice and equity as shall reconcile diversified interests and bind in imperishable bands all parts of society. "We pray thy benediction, especially on the women of America, who, for the first time in the history of our race, take so conspicuous a place in a national celebration. May the light of their intelligence, purity and enterprise shed its beams afar, until in distant lands their sisters may realize the beauty and glory of Christian freedom and elevation. We beseech thee, Almighty Father that our beloved Republic may be strengthened in every element of true greatness, until her mission is accomplished by presenting to the world an illustration of the happiness of a free people, with a free church, in a free state, under laws of their own enactment, and under rulers of their own selection, acknowledging supreme allegiance only to the King of kings and Lord of lords. And as Thou didst give to one of its illustrious sons first to draw experimentally the electric spark from Heaven, which has since girdled the globe in its celestial whispers of 'Glory to God in the highest, peace on earth and good will to men,' so to latest time may the mission of America, under divine inspiration, be one of affection, brotherhood and love for all our race. And may the coming centuries be filled with the glory of our Christian civilization."

THE CENTENNIAL HYMN.

At the conclusion of the prayer, Whittier's Centennial Hymn, arranged to music by John K. Payne, was sung with organ and orchestral accompaniment:

Our father's God! from out whose hand
The centuries fall like grains of sand,
We meet to day, united, free,
And loyal to our land and Thee,
To thank Thee for the era done,
And trust Thee for the opening one.

Here where of old, by Thy design,
The fathers spoke that word of Thine
Whose echo is the refrain,
Of ages past, fallen in chain,
To grace our festal time from all
The zones of earth our guests we call.

Be with us while the New World greets
The rising sun, and brings it to its streets,
Unveiling all the triumphs won,
By art or toil beneath the sun;
And unto common good ordain,
This rivalry of hand and brain.

Thou hast here in concord furled
The war flags of a gathered world,
Beneath our western skies fulfill,
The Orient's mission of good will,
And, freighted with Love's golden fleece,
Send back the Argonauts of peace.

For art and labor met in true,
For beauty made the bride of use,
We thank Thee, while withal we crave
The austere virtues strong to save,
The honor proof to place or gold,
The manhood never bought or sold!

O! make Thou us through centuries long,
In peace secure, in justice strong;
Around our gift of freedom draw
The safeguards of Thy righteous law,
And, cast in some diviner mold,
Let the new cycle shame the old!

PRESENTATION OF THE BUILDINGS.

The Exhibition buildings were then presented to the United States Centennial Commission by John Welsh, president of the Centennial Board of Finance, with the following address:

"MR. PRESIDENT AND GENTLEMEN OF THE UNITED STATES CENTENNIAL COMMISSION: In the presence of the government of the United States and of the several distinguished bodies by whom we are surrounded, and in behalf of the Centennial Board of Finance, I greet you.

"In readiness at the appointed time, I have the honor to announce to you that, under your supervision and in accordance with the plans fixed and established by you, we have erected the buildings belonging to us, and have made all the arrangements devolving on us necessary for the opening of the 'International Exhibition.' We hereby now formally appropriate them for their intended occupation; and we hold ourselves ready to make all further arrangements that may be needed for carrying into full and complete effect all the require-

ments of the acts of Congress relating to the Exhibition.

"For a like purpose, we also appropriate the buildings belonging to the State of Pennsylvania and the city of Philadelphia, erected by us at their bidding, to wit: Memorial Hall, Machinery Hall and Horticultural Hall. These and other substantial offerings stand as the evidence of their patriotic co-operation. To the United States of America, through Congress, we are indebted for the aid which crowned our success.

"In addition to those to which I have just referred, there are other beautiful and convenient edifices, which have been erected by the representatives of foreign nations, by State authority and by individuals, which are also devoted to the purposes of the Exhibition.

"Ladies and gentlemen: If in the past, we have met with disappointments, difficulties and trials, they have been overcome by a consciousness that no sacrifice can be too great which is made to honor the memories of those who brought our nation into being. This commemoration of the events of 1776 excites our present gratitude. The assemblage here to-day of so many foreign representatives uniting with us in this reverential tribute is our reward.

"We congratulate you on the occurrence of this day. Many of the nations have gathered here in peaceful competition. Each may profit by the association. This Exhibition is but a school; the more thoroughly its lessons are learned, the greater will be the gain, and when it shall have closed, if by that study the nations engaged in it shall have learned respect for each other, then it may be hoped that veneration for him who rules in high will become universal, and the angels' song once more be heard—

"Glory to God in the highest,
And on earth peace, good will toward men."

THE CANTATA.

The following cantata, by Sidney Lanier, of Georgia, was then sung to music composed by Dudley Buck, of Connecticut. The basso solo was Myron W. Whitney of Boston.

From this hundred-teraced height
Sight more large with nobler light
Ranges down yon towering years:
Hunger and pain and love and tears
Shamed and fall, shine and fall,
While old voices rise and call
Yonder where the to and fro
Weltering of my Long Ago
Moves about the moveless base
Far below my rest ing place.

Mayflower, Mayflower, slowly hither flying,
Trembling Westward o'er yon barking sea,
Hearts within Farewell, dear England, sighing,
Winds without But dear in vain replying,
Gray-lipp'd waves about them shouted, crying,
No! It shall not be!

Jamestown, out of thee—
Plymouth, thee—thee, Albany—
Winter cries, Ye freeze; away!
Fever cries, Ye burn: away!
Hunger cries, Ye starve; away!
Vengeance cries, Your graces shall stay!

Then old Shapes and Masks of Things,
Framed like Faths or clothed like Kings—
Ghosts of Goods once fleshed and fair,
Grown foul Bads in alien air—
War, and his most noisy lords,
Tongued with lith and poisoned swords—

Error, Terror, Rage and Crime,
All in a windy night of time
Cried to me from land and sea,
No! Thou shall not be!

Mark!
Huguenots whispering ye in the dark,
Puritans answering ye in the dark!
Ye, like an arrow once true to his mark,
Darts through the green archer's art of Denial,
Patience and Labor and solemn-souled Trial,
Foiled, still beginning,

Soldied, but not slitting,
Toll through the stertorous death of the Night,
Toll, when wild brother-wars new dark the Light,
Toil, and forgive, and kiss o'er, and replieth.

Now Praise to God's oft-granted grace,
Now Praise to Man's undaunted face,
Despite the land, despite the sea,
I was: I am: and I shall be—

How long, Good Angel, O how long?
Sing me from Heaven a man's own song!

"Long as thine Art shall love true love,
Long as thy Science truth shall know,
Long as thine Eagle harms no Dove,
Long as thy Law shall grow,
Long as thy Land shall be low,
Thy brother every man below,
So long, dear Land of all my love,
Thy name shall shine, thy fame shall glow!"

Music, from this high of time my Word unfold:
In thy large souls all men's heart's Man's Heart
behold:

Mid-heaven unroll thy chords as friendly flags unfurled,

And wave the world's best lover's welcome to the world.

PRESENTATION OF THE EXHIBITION TO THE PRESIDENT.

The Exhibition was then presented to the President of the United States by Joseph R. Hawley, President of the United States Centennial Commission, with the following words:

"MR. PRESIDENT: Five years ago the President of the United States declared it fitting that the completion of the first century of our national existence should be commemorated by an exhibition of the national resources of the country and their development, and of its progress in those arts which benefit mankind, and ordered that an exhibition of American and for-ign arts, products and manufactures should be held under the auspices of the government of the United States, in the city of Philadelphia, in the year 1876. To put into effect the several laws relating to the exhibition, the United States Centennial Commission was constituted, composed of two Commissioners from each State and Territory, nominated by their respective Governors and appointed by the President. The Congress also created our auxiliary and associate corporation, the Centennial Board of Finance, whose unexpectedly heavy burdens have been nobly borne. A remarkable and prolonged disturbance of the finances and industries of the country has greatly magnified the task; but we hope for a favorable judgment of the degree of success attained. July 4, 1873, this ground was dedicated to its present uses. Twenty-one months ago this Memorial Hall was begun. All the other 180 buildings within the enclosure have been erected within 12 months. All the buildings embraced in the plan of the Commission itself are finished. The demands of applicants exceeded the space, and strenuous and continuous efforts have been made to get every exhibit ready in time.

"By general consent the exhibition is appropriately held in the City of Brotherly Love. Yonder, almost within your view, stands the venerated edifice wherein occurred the event this work is designed to commemorate, and the hall in which the first Continental Congress assembled. Within the present limits of this great park were the homes of eminent patriots of that era, where Washington and his associates received generous hospitality and able counsel. You have observed the surpassing beauty of the situation placed at our disposal. In harmony with all this fitness is the liberal support given the enterprise by the State, and the people individually.

"In the name of the United States, you extended a respectful and cordial invitation to the governments of other nations to be represented and to participate in this exhibition.

You know the very acceptable terms in which they responded, from even the most distant regions. Their commissioners are here, and you will soon see with what energy and brilliancy they have entered upon this friendly competition in the arts of peace.

"It has been the fervent hope of the Commission that during this festival year the people from all States and sections, of all creeds and churches, all parties and classes, burying all resentments, would come up together to this birthplace of our liberties, to study the evidence of our resources, to measure the progress of a hundred years, and to examine to our profit the wonderful products of other lands; but especially to join hands in perfect fraternity, and promise the God of our fathers that the new century shall surpass the old in the true glories of civilization. And furthermore, that from the association here of welcome visitors, from all nations, there may result not alone to great benefit to invention, manufacture, agriculture, trade and commerce, but also stronger international friendships and more lasting peace.

"Thus reporting to you, Mr. President, under the law of the government, and the usage of similar occasions, in the name of the United States Centennial Commission, I present to you the International Exhibition of 1876."

PRESIDENT GRANT'S SPEECH.

President Grant then delivered the following address, and proclaimed the opening of the International Exhibition of 1876:

"MY COUNTRYMEN: It has been thought appropriate, upon this Centennial occasion, to bring together in Philadelphia, for popular inspection, specimens of our attainments in the industrial and fine arts, and in literature, science and philosophy, as well as in the great business of agriculture and of commerce.

"That we may the more thoroughly appreciate the excellencies and deficiencies of our achievements, and also give emphatic expression to our earnest desire to cultivate the friendship of our fellow members of this great family of nations, the enlightened agricultural, commercial and manufacturing people of the world have been invited to send hither corresponding specimens of their skill to exhibit on equal terms in friendly competition with our own. To this invitation they have generously responded; for so doing we render them our hearty thanks.

"The beauty and utility of the contributions will this day be submitted to your inspection by the managers of this exhibition. We are glad to know that a view of specimens of the skill of all nations will afford to you unalloyed pleasure, as well as yield to you a valuable practical knowledge of so many of the remarkable results of the wonderful skill existing in enlightened communities.

"One hundred years ago our country was new and but partially settled. Our necessities have compelled us to chiefly expend our means and time in felling forests, subduing prairies, building dwellings, factories, ships, docks, warehouses, roads, canal machinery, etc., etc. Most of our schools, churches, libraries and asylums have been established within a hundred years. Burdened by these great primal works of necessity, which could not be delayed, we yet have done what this exhibition will show in the direction of rivaling older and more advanced nations in law, medicine and theology; in science, literature, philosophy and the fine arts. Whilst proud of what we have done, we regret that we have not done more. Our achievements have been great enough, however, to make it easy for our people to acknowledge superior merit wherever found.

"And now, fellow citizens, I hope a careful examination of what is about to be exhibited to you will not only inspire you with a profound respect for the skill and taste of our friends from other nations, but also satisfy you with the attainments made by our own people during the past one hundred years. I invoke your generous co-operation with the worthy Commissioners to secure a brilliant success to this International exhibition, and to make the stay of our foreign visitors—to whom we extend a hearty welcome—both profitable and pleasant to them.

"I declare the International exhibition now open."

The exhibition opened at the conclusion of the President's speech (12 m.) General Hawley gave a signal, and the American flag was unfurled from the main building. Simultaneously the national salute of 100 guns was fired from a battery located on St. George's Hill, the highest elevation in Fairmount Park, and chimes were rung in different parts of the grounds. The foreign commissioners then passed from the platform into the main building and took places in the central aisle, before their respective departments, after which President Grant, accompanied by Director-General Goshorn, followed by the guests of the day, also passed into the main building, and thence to Machinery Hall, and from there to the Judge's quarters, where a reception by the President was held.

THE GREAT ENGINE RUNNING.

The procession, headed by the President, after passing through the main exhibition building, passed to the Machinery Hall, where the President, at 1:22 p.m., put in motion the great engine, thus starting all the machinery in that building.

This closed the formal ceremonies of the day. The military then marched through the grounds, and all the buildings were opened to the public.

The following was the order of the procession as it passed through the main building:

The President of the United States, and Alfred T. Goshorn, Director General.

The Chief Justice of the United States.

The President of the Senate.

The Speaker of the House of Representatives.

Joseph R. Hawley, the President of the U.S. Centennial Commission.

John Welsh, President of the Centennial Board of Finance.

Hon. Daniel J. Morrell, Chairman Ex. Com. U.S. Centennial Commission.

STARTING THE MACHINERY.

About one o'clock the President and party moved from the main building to Machinery Hall. The crowd had been kept out of the latter building until after the procession filed in. There were probably a thousand people waiting around the Corliss engine to witness the ceremony of the starting of steam by the President. The other ten engines in the place bring the steam capacity of the engines in Machinery Hall up to about 5000 horse-power.

The first to mount the engine's platform was Governor Libbey, of Rhode Island, with his numerous staff. Then followed Governor

Bodie, of New Jersey, and staff; Governor Hartranft, of Pennsylvania, and staff, and Governor Rice, of Massachusetts, and staff; Mayor Wickham, of New York; George W. Childs, of Philadelphia; Ernstus Brooks, Postmaster Fairman, Congressman Charles M. Adams, of New York, and a number of other citizens. Soon the President arrived, escorting Her Majesty the Empress of Brazil, followed by the Emperor Dom Pedro escorting Mrs. Grant. The crowd had grown as large and dense as possible within the immense hall, 1402 feet long and 360 feet wide, when the order "Down in front," cleared the steps to the engine, and revealed on the platform President Grant, with his hand on one wheel and the Brazilian Emperor holding the other. Mr. Corliss instructed them both how to manage them. Dom Pedro was told to start his first. This he did, and waited as if it was a mere matter of form, with no consequences. The President then turned his side, and in a second the steam began to hiss. Then came the movement of the piston, an automatic and regular climbing up and down of many tons of iron and steel. By this time the ladies had been seated, and the President and Dom Pedro stood there, hardly knowing what to do or say. The revolutions of the immense machine caused a vibration in the immediate vicinity, and the crowd cheered and became enthusiastic. The machinery in the Women's Pavilion was started by the Empress of Brazil.

THE EXHIBITION.

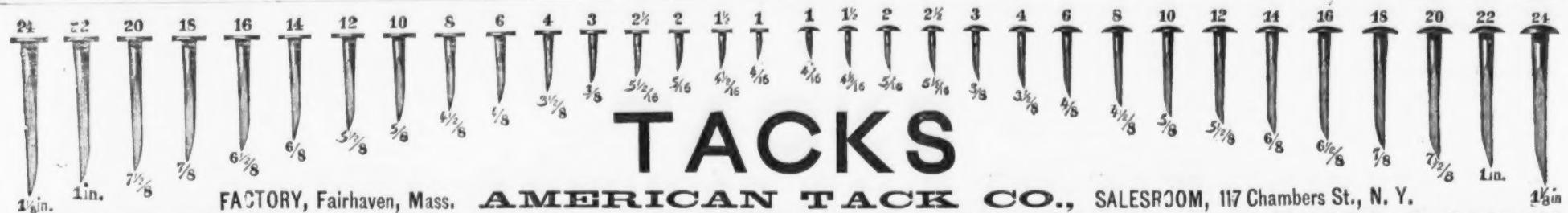
As soon as the procession started the vast assemblage which had gathered about the platform scattered in all directions, and filled the several buildings. From that time to the closing of the grounds presented the appearance of a vast kaleidoscope, the many colored units of the surging mass constantly shifting and readjusting themselves in new combinations of infinite variety. Taken as a whole, the opening was a great success. A hasty glance through the city of buildings shows that everything is beautiful and inspiring in art, useful in mechanics, valuable in science, or attractive in nature, can be seen and studied, until the eye grows tired of seeing and the mind wearied of studying.

VIENNA AND PHILADELPHIA.

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VIENNA AND PHILADELPHIA.

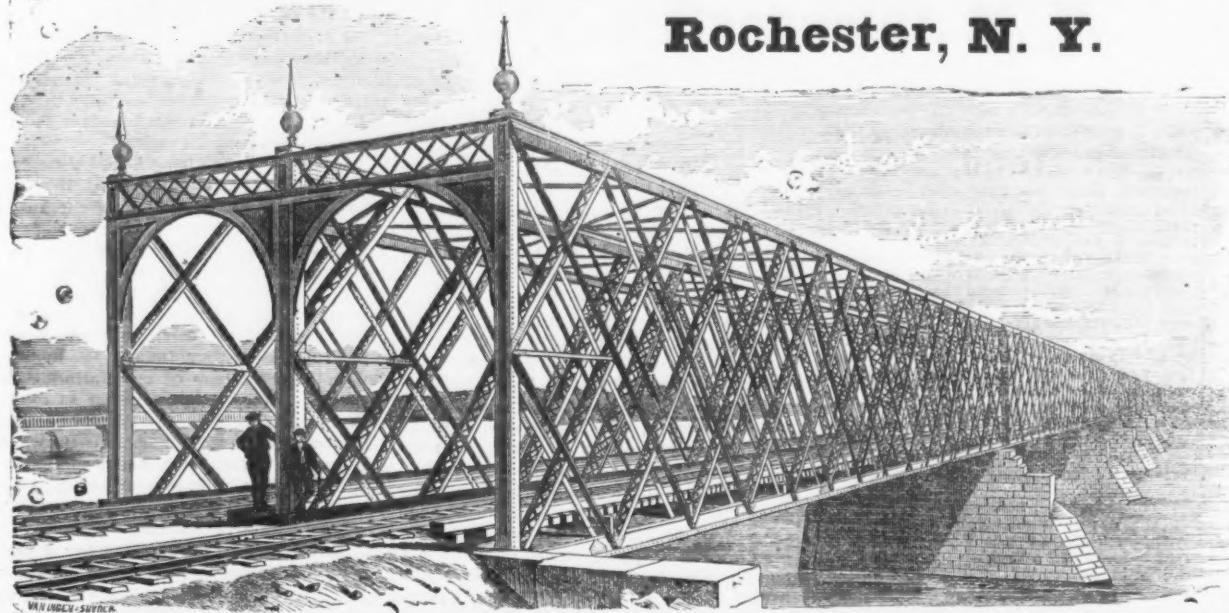
The question is often asked, "How does this exhibition compare with the others, and especially with that at Vienna?" It is difficult to answer this question, and then only in a general way. We have 56½ acres under roof, while Vienna had 38½. Our exhibition is nearly twice as large as that of Paris, more than twice as large as that of Hyde Park, and eleven times as large as our little World's Fair in New York which President Pierce and his Cabinet opened with so much state nearly a quarter of a century ago. These figures are deceptive, because many buildings within these grounds are not essential to the exhibition. If the money spent in State buildings had been devoted to the collection of the mineral, agricultural or industrial resources of each State in some of the main halls, it would have been more useful. There were none of these at Vienna, and beyond affording a loading place for the free minded American citizen to discuss the Presidential canvass during the warm summer afternoons, they have no great value. Vienna



FACTORY, Fairhaven, Mass. AMERICAN TACK CO., SALESROOM, 117 Chambers St., N. Y.
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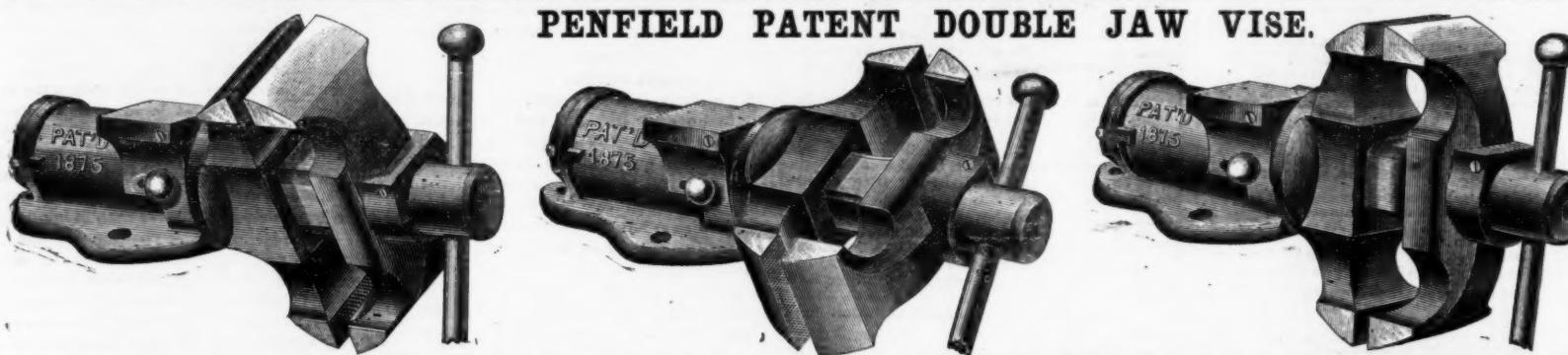


SPRING PERCH CO., Bridgeport, Conn.
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SPRINGS & AXLES

And Beer's Patent Curtain Rollers, Concealed Hinges, Etc., Springs of any pattern made to order. Send for Circular and Price List.

PENFIELD PATENT DOUBLE JAW VISE.



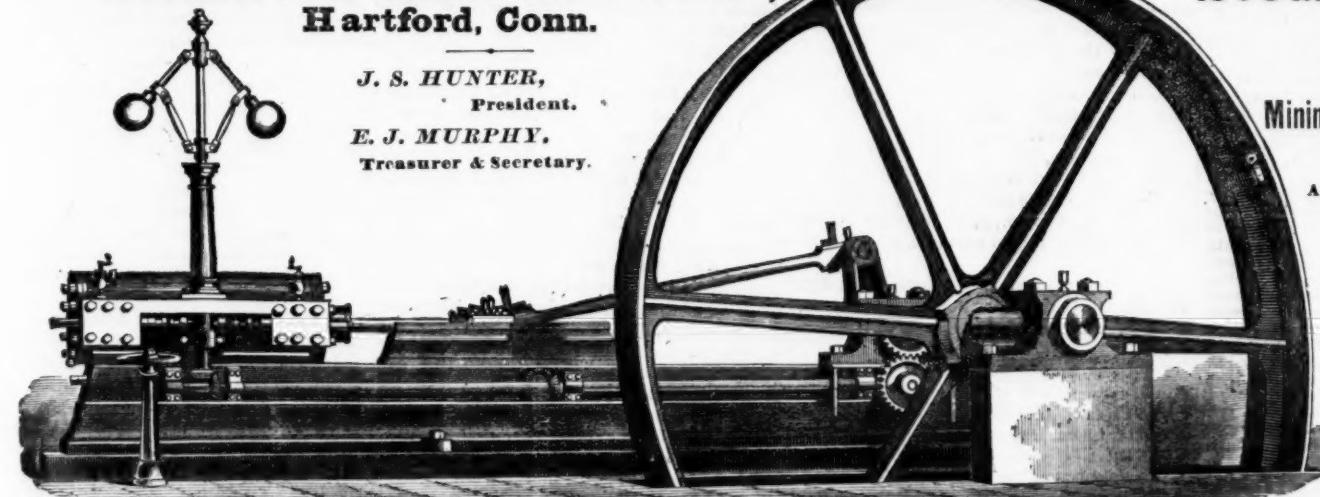
We call your attention to a new form of Patented Vise, possessing double jaws, which may be so adjusted as to hold an object at any desired angle with great firmness. This arrangement offers great advantages over any other Vise, as the operator can place his work at any angle best suited to his convenience. On the standard there is a spring bolt, which, when it is desired to adjust the jaws, is drawn back, and the jaws are set at any desired position. The face of one pair of jaws are roughened, and those of the other pair are smooth, to suit different kinds of work. The whole construction of the Vise is such as to prevent any chips or filings entering the working parts. Into the end of the standard is placed the flange nut, into which passes the Vise screw, which is on a direct line with the flange nut, which is held in its position by the rear end of the standard by two steel screws holding it firmly in its place. Send for Circular and Price List.

THE HARTFORD FOUNDRY AND MACHINE CO.,

Successors to the

WOODRUFF & BEACH IRON WORKS, Hartford, Conn.

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High & Low Pressure Marine & Stationary

Steam Engines

AND

Boilers,

Mining, Powder and Paper Mill
Machinery,

And every Variety of Iron and Com-
position Castings made
to order.

The following are a portion of the
Engines manufactured at these works
and are a sufficient guarantee of our
capacity for doing first-class work.
The Portable Engines in the
cities of Brooklyn, N. Y., St. Louis,
Mo. and Hartford, Conn., and in the
Charlestown, Mass., and Norfolk, Va.,
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U. S. Steam Sloops of War Michigan,
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America and United States. Also the
large Horizontal Engine for the new
Plate Mill of the Bay State Iron Co.

ERIE Lawn Mower.

The gearing is so perfectly inclosed,
that it needs no clearing.
The cutter is so constructed
that it is impossible for grass to wind
around the shaft.
Has adjustable cut.



Inside Gearing.

Manufactured by

H. M. REED & CO.,

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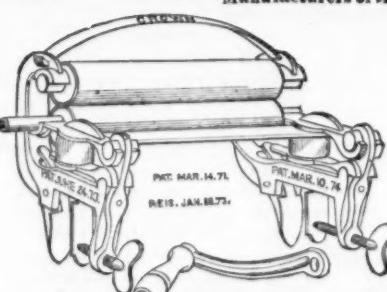
The most perfect Lawn Mower in the
market. Has so few parts that nothing
can get out of Repair.

Is so simple in construction that any
one can understand it.

Works so easily that a child can run it.
Does the work so perfectly that all
admire it.

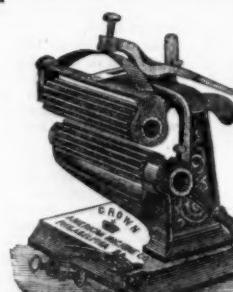
The American Machine Co.,

Manufacturers of the celebrated



CROWN WRINGERS and CROWN FLUTERS.

The most popular in the market.



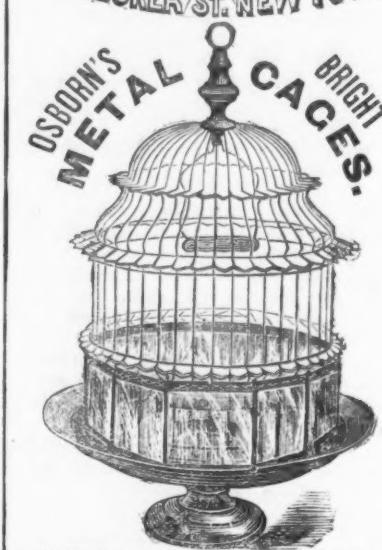
REVOLUTION INDICATORS.

The Revolution Indicator is driven like
a governor, either from a horizontal or
vertical shaft; it constantly indicates, with-
out the use of a watch, the number of turns
per minute made by a Steam Engine.

There are many engines which have to
run at varying speeds for different opera-
tions, also engines controlled entirely by
hand. For such, the Revolution Indicator
will be found particularly useful.

Circulars on application.

OSBORN MFG. CO.
TRADE MARK
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The Original Inventors and Manufacturers of the
OSBORN BRIGHT METAL CAGES.

Also OSBORN & DRAFTON Improvements under
two different patents. We are continually bringing
out new and beautiful designs to meet the demands of
refinement and taste.

ALVAN DRAFTON General Agent

JOHN MAXHEIMER,

Patented,

June 3, 1873; April 6, 1869

Dec. 23, 1870; Jan. 20,

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Manufacturer of

FULL SIZE OF

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Bright Metal

BIRD CAGES.
Nos. 247 & 249 Pearl Street
NEW YORK.

PYROMETERS for BLAST FURNACES.

E. BROWN'S STANDARD PORTABLE,

E. Brown's Improved

Gauntlet



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ALSO FOR SALE

PYROMETERS
For Baker's Ovens, Boiler Flues,
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Over 300 "Gauntlet" and 100
Portable Pyrometers are now in
use at Blast Furnaces.

E. Brown's Portable Blast Gauge
for the plug hole, Steam Gauges,
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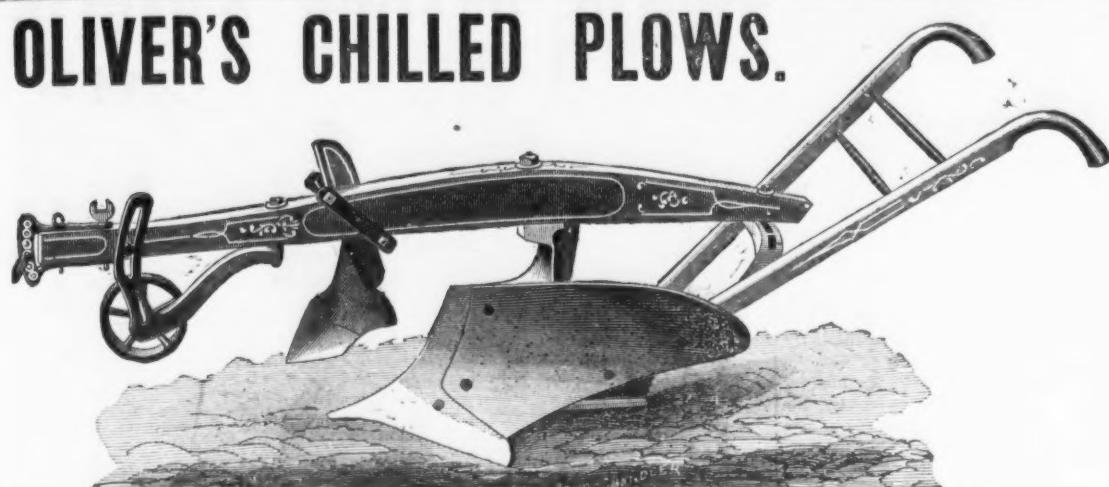
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hand. For such, the Revolution Indicator
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Circulars on application.

OLIVER'S CHILLED PLOWS.



These implements, though but four years before the public in their present form, show the following remarkable record:
1506 were sold in the season of 1871. 7472 were sold in the season of 1873. 31,077 were sold in the season of 1875.
3049 1872. 14,976 " " 1874.

The sales for 1876, will undoubtedly exceed 60,000 Plows, one-third of that quantity being now on our order book. For full descriptive circulars, address

SOUTH BEND IRON WORKS, South Bend, Ind.

SOMETHING NEW!

SAMSON WRENCH.



It is the only Wrench that will hold Gas or Steam Pipe, Gas Burners, Round Iron or Steel without slipping. Samples sent to the trade only, on receipt of fifty cents and business card.

W. J. FLANAGIN & CO., Sole Manufacturers,
Office, 32 North 5th Street, PHILADELPHIA.

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Electro Plated Ware, German Silver and Britannia Spoons.



THE "PALACE."

Factories, Wallingford, Conn.

Salesroom, 75 Chambers Street, New York.

IMPROVED DERINGER REVOLVERS.

No. 1, .22 Calibre; No. 2, .32 Calibre, Long Cartridge.



Cut Represents No. 2, .32 Calibre, 5 Shot. Size reduced one-third.

Exact Model of S. & W. No. 1 and No. 1 1/2 Revolvers.

These Arms are Half Nickel Plated and are equal in style of finish to the best Arms in the country. Quality of workmanship and material first-class; warranted. Price less than any other Hinged Barrel Cartridge Revolver of same quality in the market.

SOLE AGENTS:

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THE VICTOR PLANES

Are the most simple, compact and practical Adjustable Planes ever offered to the public. They are made under the personal supervision of Mr. L. BAILEY, the original inventor of the PATENT ADJUSTABLE IRON PLANES. All our Planes have our TRADE MARK. Send for Catalogue, embracing Planes, Try Squares, Bevels, Rules, Levels, Hammers, Mitre Boxes, etc., etc.



CLARK'S PATENT EXPANSIVE BITS

Made of JESSOP'S BEST CAST STEEL, and warranted superior to any other.

Two sizes: Large Size Boring, $\frac{3}{4}$ to 8 inches; Small Size Boring, $\frac{1}{2}$ to $1\frac{1}{4}$ inches.



W.A. CLARK'S PATENT.

Manufactured by

WILLIAM A. CLARK, - - - Westville, Conn.

Improved Apple Parers.

We present herewith illustrations of apple paring machines manufactured by D. H. Whittemore, which possess some important improvements over his patterns of last year.

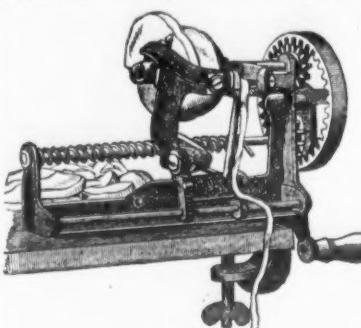


Fig. 1.

Figure 1 shows the "Bay State" Paring, Coring and Slicing Machine, improved so that the apple is cut and thrown from the fork in slices while the paring is being done, leaving only the core to be removed.



Fig. 2.

Figure 2 shows the Skeleton Apple Paring, Coring and Slicing Machine, with a similar slicing arrangement as the "Bay State," completely finishing the apple.

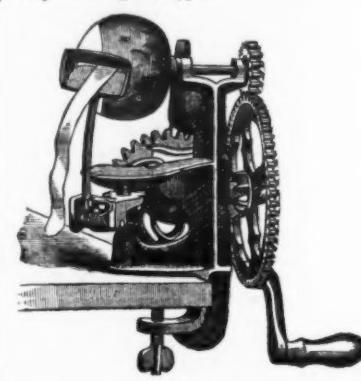


Fig. 3.

Figure 3 shows the Union Apple Parer, improved by the use of a larger driving wheel and a small gear instead of cans, requiring only two turns of the crank to an apple. It is strong, and has a "push-off" attachment.

J. Clarke Wilson & Co., No. 81 Beekman street, are sole agents for these goods, the prices for which will be found in our trade report, under the head of "General Hardware."

Improved Casting Arrangements for the Siemens-Martin Process.

Mr. Michael Scott, of London, proposes an improvement in the arrangements for casting steel melted by the Siemens-Martin process, which may be briefly described as follows:

Upon a base plate mounted upon wheels, which run upon rails laid in the bottom of the casting pit, a number of molds are ranged round a central git. Each mold communicates near its bottom with a git, by means of a runner pipe of fire brick. The central git is a tube of fire brick, in some instances cased in iron, probably boiler plate, bent to fit the brick tube, but tube and iron casing being divided longitudinally into two or more parts, the joints in the brick tube being opposite the solid part of the casing, and vice versa. The git is tapered both inside and outside, being larger in diameter at the lower end, and the parts of which it is formed are secured together by elastic hoops forced from above along the tapered exterior.

These hoops are rings of iron or steel, made to the shape of the outside of the git, with portions of their periphery bent into loops that can yield or spring a little. When prepared for use, the git is provided at the top with a feeding head, having a side spout situated a little above the level of the tops of the surrounding molds, and this spout is directed over a spare mold, which does not communicate with the bottom of the git. The object of this arrangement is that as a surplus of metal must always be provided, in order to insure the complete filling of the molds, the spare mold would be a receptacle for the residuary metal.

The platform supporting the molds and git being run up near to the melting furnace, sufficient space, however, being left for a slag box, a spout lined with fire brick, or other suitable material is so placed as to extend from the top hole of the furnace to the feed head of the git. On first tapping the furnace, a metal plate is held in an inclined position over the upper end of the spout, so as to direct the first material from the tapping hole down into the slag box, but as soon as the metal begins to run, this plate is withdrawn, and the metal then flows along the spout to the enlarged head at the lower extremity, where such cinder as may be carried with the metal floats upon the surface. The stopper in the enlarged head of the spout being then raised, the metal flows down the git, charging the molds to the top, after which the surplus metal flows into the spare mold. As soon as the flow of metal from the furnace ceases, the end of the spout is shifted aside,

and the slag runs down it to the slag box. It will be seen that from the time the metal begins to run into the molds, there is no machinery to be moved, in fact nothing to be done, and, therefore, but little risk of a hitch occurring during the operation of casting. The spout having been removed, the platform bearing the charged mold is wheeled away from the furnace, and the furnace men relieved from the heat. The molds are then taken off the ingots, the runner pipes broken, the runners cut, and the ingots removed. The central git is taken to pieces, the base is divided into three parts, the lower half being in one piece, and the upper half consisting of two pieces. By this arrangement, when the upper pieces are removed, the steel filling the git and runners can be lifted up and carried away.

The castings surrounding the base of the git and runner pipes are of sheet iron bolted to the base plate. When filled with sand, all joints are enveloped and secured so as to prevent the escape of metal even should the pipes be fractured. When casting very tall ingots, the sand may be rammed and the covers put on. The central git being formed of refractory material, it would not be cut up by the hot metal, even if a large quantity passed through it, as would certainly be the case if an iron git were used. It will be observed that there is a fire brick lump proposed for the bottom of the molds, which, when using molds closed at the top, would afford the double advantage of regulating the length and consequently the weight of the ingot, and of protecting the lower edges of the mold which are frequently attacked by the hot metal. This power of regulating the length of the ingots when using close topped molds, is one of some importance, for any weight of ingot beyond what is required becomes scrap, and with a variety of weights required, either this must be submitted to, or a large stock of molds kept. When using split molds, it is intended that the parts should be secured together by elastic hoops. The metal setting in the central git would form an ingot of useful dimensions, and the horizontal runners would be of such size as to be available for many purposes. These runners being cast under considerable head or pressure ought to be sound, and they would be clean castings. The slag box under the tapping hole of the furnace is arranged so as to be lifted by a crane and placed upon a truck, to which it is attachable by hinged joints at one of its lower corners, and a barrel worked by a winch is provided at the other side of the truck, with chains attached to the angle of the box below the barrel. When the truck has been wheeled to the side for tipping, the chain is wound on the barrel, and the box is thereby canted on its hinged joints, until the center of gravity passes beyond them, whereupon the box tips over and delivers its contents. By again turning the barrel, the box is drawn back and lowered into its normal position on the truck.

The proposed apparatus requires no alteration in ordinary casting pits—ladies would be abolished—the debris arising when clearing the tapping port, and any cinder which appears at first would not go into the spout, whilst provision is made for instantly changing the direction of flow from the furnace, when all the metal is out, and directing the mass of the slag into a suitable receptacle, while the construction and working of the whole is simple and inexpensive. These points are not unimportant, for if the run of the metal requires to be stopped, as in the event of changing from the filling of one mold or group of molds to another, then, although not so large, a ladle is still required to contain the metal flowing continuously from the furnace, whereas in the author's plan there would be no interruption to continuous flow into the molds. No doubt the dimensions of the ladle could be diminished by reducing the flow from the furnace, but according to the author's ideas, this is the very thing to be avoided, for the more rapidly the furnace is emptied the better.

Preparing for the Final Blast at Hell Gate.

The work of excavation at Hell Gate, preparatory to the final blast, has been finished several weeks, and the only work going on there at present is the pumping out of the water which filters into the mine from above, and the building of a piece of sea-wall to protect the shore from the action of the current which will sweep against it as soon as the reef is removed. This wall, which will be 150 feet long, 8 feet thick, and 12 feet high, is flanked at each end by a heap of debris, making an efficient protection to the soft earth of the shore. The testing of the various explosives used in submarine blasting has been going on for some time, and a dozen different preparations of nitro-glycerine were exploded on Friday last with a view of testing their efficiency for this work. The gun-cotton prepared at Stonemarsh, near London, has thus far given the most satisfactory results, and will probably be the explosive adopted. This material has not been much used in our government work, and no manufacturer of it exists in this country. It will be placed in holes drilled in the piers and in the roof, those in the latter being placed five feet apart and extending half way through its thickness. About thirty tons of gun cotton will be required, which will be placed in position at the last moment, that it may be exposed as little as possible to the action of the water. The present appropriation will cover the expense of the final blast, and before that takes place it is hoped that a sufficient appropriation will be made to secure the removal of the debris.

A French writer says civilization seems to be reduced down to the fine point of building iron clad vessels capable of resisting the heaviest projectiles, and subsequently turning out guns sufficiently powerful to drill daylight through their hulls.

(Continued from Page 17.)

and others place their most attractive show cases along the line of the aisle.

We give below a brief description of the exhibits of the principal countries occupying space in the Main Building:

THE UNITED STATES.

Nearly one-third of the entire space is occupied by our own people, whose exhibits cover about seven acres, and are mostly contained in show cases of great variety. In the very thing in which foreigners were supposed to have more taste, as they were known to have more experience—the devising of handsome accessories to enhance the attractiveness of exhibits—our countrymen lead all rivals. Wandering through the long avenues, lined by cases of strikingly novel designs and elaborate workmanship, one may be wearied by the endless variety, and may find the simple uniformity of the French section a relief; but he cannot fail to be impressed by the fertility of resources, the original genius for decorative effects, and the evident liberality of expenditure displayed; and he will remark a certain unstudied harmony in dissimilarity produced by the mingling of diverse colors and forms, and may find in it a faithful reflex of our composite American life. The American display is in no respect a disappointment.

GREAT BRITAIN AND HER COLONIES.

The section occupied by British exhibits is not inclosed by a pavilion, and there is a conspicuous absence of decoration—the idea being that too much elegance in the surroundings would detract from the interest of the articles exhibited. The cases are very plain, and are stained black. The main features of the British exhibit are pottery, silver-plate, galvanoplastic reproductions of medieval art works and tiles. Cutlery from Sheffield and other cities stands prominent—here and there being seen crowns, sun-bursts and other emblematic figures formed from knives, forks and spoons.

Canada occupies almost as much space as the mother country—Quebec, Ontario, Manitoba, Nova Scotia, New Brunswick and British Columbia being represented. The geological department is made a leading feature of the exhibition. The ores and petroleum are noticeable. The Commissioners point out a lump of plumbago 6 feet by 4, said to be the largest ever mined. Fine specimens of red granite from New Brunswick also attract attention. The ship-building industry is represented by an interesting display of models from leading ship yards on the sea coast. Specimens of stoneware, which are claimed to equal the celebrated Staffordshire ware, are shown. Marble mantelpieces, made in Montreal, are claimed by the exhibitors to equal in delicacy of finish and beauty of design the Italian. The boot and shoe interests, drugs and chemicals, sewing machines, circular and other saws, pianos, and segars have also fine samples in the collection. The extent and variety of Canadian industries, as represented here, will surprise English and American visitors. Victoria shows models and the products of her gold mines, and some fine copper work; South Australia shows principally the products of the soil; New Zealand is chiefly represented in pictorial delineations of her natural scenery and people; The Cape of Good Hope sends various choice natural products; India is principally represented by articles taken from the India Museum, London, and the other colonies by natural products. None of them occupy much space or will be centers of attraction.

France is much behind the other nations in getting her department ready, and it will scarcely be presentable under a fortnight. The place of honor in the crescent fronting the open space, where nave and transept of the building cross, is occupied by a mantel piece 15 feet high, in black marble, ornamented with statues and high reliefs of gilt and verd antique bronze. The maker is L. Marchand, and the work is a *chef d'œuvre* of its class, unequalled in the exhibition. Largest and most attractive of all the groups is that of porcelain. There are four exhibitors of porcelain proper, and six of faience and majolico; among the latter is Barbezat, whose reproductions of Palissy ware are famous; Blot, Jules Honry, Hache & Pepin and Haviland. One establishment shows only work in imitation of old faience. The entire porcelain display faces that of the English, from which it is separated only by a broad walk. Comparisons between the art of the two countries will eventually arise, and the verdict of critics, as in most matters of taste, will not always agree. Silks and velvets occupy a large space. The exhibit is collective in tall cases enclosing a court, with cushioned seats in the center. The display of that large class of objects known on the Continent as *Articles de Luxe*, is of course extensive. This class of ware includes jewelry, bronzes, clocks, mantle ornaments of all styles and materials, fans, ivory crosses and small art works of all kinds. As a whole this exhibit will possess great interest for all classes of visitors.

GERMANY.

The feature of the German Exhibition is the pottery from the Royal Prussian factories. This is of great beauty and variety, and shows a high artistic standard among the German decorative painters. The literature of Germany is well represented by a splendid display of books; her manufactures by the choicest products of workshop and factory.

A very striking exhibit is made by a Hamburg ivory manufacturer of a case of elephants' tusks and ebony. Of toys the show is large, as was to be expected, for Germany supplies the entire civilized world with children's playthings. Leather goods are well represented. The group of chemical products is exceedingly full. Two firms of lead pencil makers vie with each other in the size and elegance of their displays. The

Bavarian makers of metallic foils and bronzes make a noticeable display. In the way of general domestic manufactures the articles are too numerous to specify without falling into a catalogue style. The chief impression produced by the German section is, that while the idea of beauty is not lost sight of, it is subordinate to that of use. Durability is sought rather than ornament, and although many articles possess considerable beauty, there is a certain heaviness that characterizes them all. This quality is undoubtedly an outgrowth of German national taste, and expresses the Teutonic idea of beauty far better than does the elegant lightness of French ornament.

THE NETHERLANDS.

Externally, the Dutch section is very ornamental, and the manufactures exhibited show that the arts have attained a high degree of perfection in that country. The display is chiefly characterized by variety, and will attract much attention.

BELGIUM.

Belgium presents an extensive variety of excellent products. The group of iron and steel is not as large as might have been expected, but it is extremely interesting. It includes bar iron, rails, steel ingots, bridge girders, car wheels and nail rods. The exhibit of arms is very fine, and all the industries of this busy and enterprising little kingdom are very creditably represented.

NORWAY AND SWEDEN.

The departments occupied by the two divisions of the Scandinavian Peninsula are well filled and very interesting. Norway's exhibit is rather miscellaneous in character, but will be found curious and well worthy of study. Sweden makes a fine exhibit of Bessemer steel. The largest contribution of this kind is that of the Sandvik & Fagasten Works. Here are to be seen specimens varying in character from a piston rod 15 feet long, for a steam hammer of five tons, to a finely polished hand mirror for a lady's boudoir. Locomotive tires are shown which are said to have run 187,750 English miles without having been "turned." There is an almost endless variety of steel files, saws and other tools of the finest workmanship. There is a large display of the finer articles of iron and steel manufacture, such as scissors, knives, skates, swords, etc. Among other articles is an odd case filled with safety matches from Johnkoping. Match making is a great industry in Sweden. The extent to which the art of wood-carving is developed is shown by a triumphal arch fifteen or twenty feet high contributed by a nobleman, H. H. V. Esen. This arch is the work of the peasantry on his large estate. The display of porcelains is exceedingly fine. Floral decorations are much used, and for ground-work tints of extreme delicacy and beauty are employed. A tall chimney piece of an opalescent blue is elegant. A large map of the geological survey of the kingdom and a topographical map are excellent in their way. A very attractive feature is Parian marble models of fountains in the various squares of Stockholm, from the two factories of Rostrand and Gustafberg. Across the main avenue and separate from the exhibits mentioned is a military display, consisting of small arms, cartridges, shot and shell, a gun and caisson, and various accoutrements.

AUSTRIA AND HUNGARY.

In the character of their exhibits the Austrian Empire differs but little from Germany. The department is well filled and presents a pleasing variety of articles, few of which will have special interest for our readers.

ITALY.

exhibits works of art almost exclusively. The display is of wonderful beauty and value, and is rich in treasures of painting, metal work and pottery.

SWITZERLAND.

makes a specialty of watch makers' tools, watches and wood carvings. This department appears to be one of the best and most systematically arranged in the building, and does great credit to the Swiss Commission.

SPAIN.

has provided an inclosure of striking beauty, filled with a great variety of useful and beautiful products. The character of the Spanish people could not be judged from the display they make; or if it were, they would be accredited with an industry and enterprise far greater than they are commonly supposed to possess.

CHINA AND JAPAN.

The Chinese and Japanese departments in the Main Building are very curious and interesting. The Chinese exhibits are quaint, grotesque and ingenious; those of Japan seem to show a higher and more practical civilization. Many of the Japanese manufactures possess great utility, and should be more largely represented in the world's trade. Judging from the exhibits of the two countries, it would be reasonable to conclude that Japan is a much more valuable and promising neighbor than China, with a much higher capacity for useful production.

Of the displays of the other foreign countries occupying space, we have neither the time nor the space to speak. The crowd and confusion on the day of opening rendered a careful examination impossible, and but few of those not specifically mentioned have anything to show which can properly claim critical notice in the columns of *The Iron Age*. Such as do will receive careful attention during the progress of the exhibition.

MACHINERY HALL.

Outside of the Main Exhibition Building the chief interest for our readers will be found to center in Machinery Hall. This building, which is especially devoted to machinery in motion, has a length of 1402 feet and a width of 360 feet. It contains machines for working in metal, wood, glass, clay, stone, fiber, paper and gum; and also prime motors, such as steam, air and gas engines. In a separate

building are machines for working in leather, and still other buildings have certain special machines and processes. On the south side of the parallelogram forming the main body of Machinery Hall, is the hydraulic annex, 20x210 feet, with a tank 60x106 feet, around which the pumps are grouped, each discharging overhead into the tank at an equal height above the surface of the water. At the south end of this annex is a tank raised 33 feet from the floor of the hall, and pouring a cascade of water of 36 feet in breadth, the sheet of water having a weir depth of about four inches. The water is raised by two rotary pumps, each driven by an engine of 150 horse-power, and amounts to 30,000 gallons per minute.

Eight main lines of shafting are provided for the machinery in the avenues and aisles, the larger portion being speeded to 120 revolutions per minute, and one line to 240 revolutions, principally for the wood-working machines, which occupy the larger part of the west end of the southern aisle. With the subsidiary lines, the length of shafting is estimated at 10,400 feet, each main line of 650 feet transmitting 180 horse-power to the various machines connected with it.

It is obviously impossible for us to attempt any description of the contents of this great structure, especially as some of its most noteworthy features have already been mentioned in these columns. As a whole, the department is not ready for critical examination. Many of the spaces are still empty, and in others the work yet to be done is considerable. In due time we will present full and accurate reports of all its more interesting features.

Of the other buildings, whose position is given on the excellent map of the grounds published on our first page, we must reserve mention. Few of them claim our special attention, but such as do will receive it.

The buildings were only thrown open to the public on the afternoon of the day *The Iron Age* is put to press, we have had barely time for a hasty glance at some of the multitudinous exhibits of metals, hardware and machinery, and can only refer in the briefest way to a few, beside which there are a great many of equal and perhaps superior interest. Of course the great Corliss engine is one of the most striking objects to be seen in the whole exhibition, as is the huge sugar mill shown by a Glasgow house. Fine displays of machinery are also made by Thos. Wood, William Sellers, Thorne, DeHaven & Co., Ferris & Miles, Hoopes & Townsend, Allison & Sons. The display of tools by Henry Distant & Sons is of great extent, artistic in design, consisting chiefly of saws, for which they are so widely known, both in this and other countries. They have two cases, 48x20 feet, with counters in front, displaying, in addition to saws, planes, squares, chisels and other tools. Upon these two cases rests an immense arch, formed of 100 saws, representing the age of the nation. The Keystone of this arch is formed of 13 circular saws, bearing the names of the 13 original States. They also exhibit a circular saw 76 inches in diameter with 56 teeth, corresponding with the number of the signers of the Declaration of Independence, also another 100 inches in diameter, and a California Malay saw, 16 feet long by 16 inches.

Among the Hardware exhibits we notice a file over nine feet in length, made by McCaffrey & Brother, polished and etched with allegorical designs. The Hart, Bilven and Mead Manufacturing Company and P. & F. Corbin have handsome cases, containing goods of their manufacture. The Branford Lock Works and Mallory, Wheeler & Co. have also fine display, and the Yale Lock Company have erected a model post office. The Lalance & Grosjean Manufacturing Company show a fine line of deep stamped tinware and other specialties. There are several very showy cases of cutlery, swords and other polished steel goods. The Stanley Rule and Level Company, L. Coes & Co., Leonard Bailey & Co., John Russell Cutlery Company, the Ames Mfg. Co., the Collins Co., and a host of others, deserve extended notice. There is a fine display of fire arms of every kind. Among the brass manufacturers we notice the Waterbury Brass Company and the Ansonia Brass and Copper Company. William D. Wood & Co., manufacturers of American Russia sheet iron, have made one of the most unique exhibits, and one that attracts much attention. The N. & G. Taylor Co. have a large and interesting exhibit of various forms and varieties of tin plate. The safe manufacturers make a large showing; also the scale makers.

There is a large showing of iron, coal and ore from various sections. Hussey, Wells & Co., Singer, Nimick & Co., the Edgar Thompson Steel Company, and the Cambria Iron Co. have exhibits that attract general attention.

The above brief reference to a few individual exhibits is all we are able to give in this issue. Our arrangements are such that we can promise full and complete reports on all subjects concerning which our readers will look to us for information. It will be at least two weeks, and probably more, before the work of preparation is completed, and during the remaining five months of the exhibition ample opportunity will be afforded for the closest and most critical examination of every department.

The heavy and long continued rains at the West have very seriously interrupted railway travel. Of the ten roads centering in Kansas City not one was able on the 6th inst. to send out trains on time, and on only two did any trains arrive. At that point all travel was interrupted for 24 hours, and wash-outs, landslides and similar accidents attending a flood were the order of the day. It is said that no such storm has visited that part of the country for the last 15 years. The damage done to private property has been very great. At some points the rain is reported to have continued for 60 hours.

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HENRY DISSTON & SONS.



KEYSTONE SAW, TOOL, STEEL AND FILE WORKS,

Front and Laurel Streets,

PHILADELPHIA, May 10, 1876.

TO VISITORS AT THE AMERICAN CENTENNIAL.

We invite the attention of mechanics and the trade of both hemispheres, to the great improvements introduced by us in the manufacture of Saws, which have been, and still are, our leading specialty.

It is not yet twenty years since the American market was almost wholly dependent upon foreign manufacturers for Saws of every description. It was not deemed possible to establish the industry here in successful competition with foreign makers, and the prestige which so long attached to English steel and English workmanship made it difficult to introduce American Saws and Tools to the trade. These obstacles to the successful establishment of an important American industry were overcome only by making better goods at a lower price than those which could be obtained abroad; and as pioneers of Saw manufacturing in the United States, we feel justly proud of the conspicuous success which has attended our efforts to supply American mechanics with the best tools ever made in any country of the world.

OUR DISPLAY AT THE EXPOSITION.

In support of our claims to pre-eminence in this department of manufacture, we call attention to the goods shown by us at the Centennial Exposition. These we have entered in competition for first honors with the best products of other manufacturers in this and other countries; and we are confident that for variety, finish, utility and general excellence, they will be found unequaled in any department of the exhibition.

OUR WORKS AND PRODUCTS.

In the eight succeeding pages we present to the trade and public illustrations of our works and many of our principal specialties. Our establishment is the largest of its kind in the world, and contains the most perfect machinery ever constructed for the manufacture of articles similar to those made by us. Beside Saws, we are large manufacturers of Files, Steel and Tools made from sheet steel. All our Saws are made from our own steel, which is in extensive demand among other tool makers.

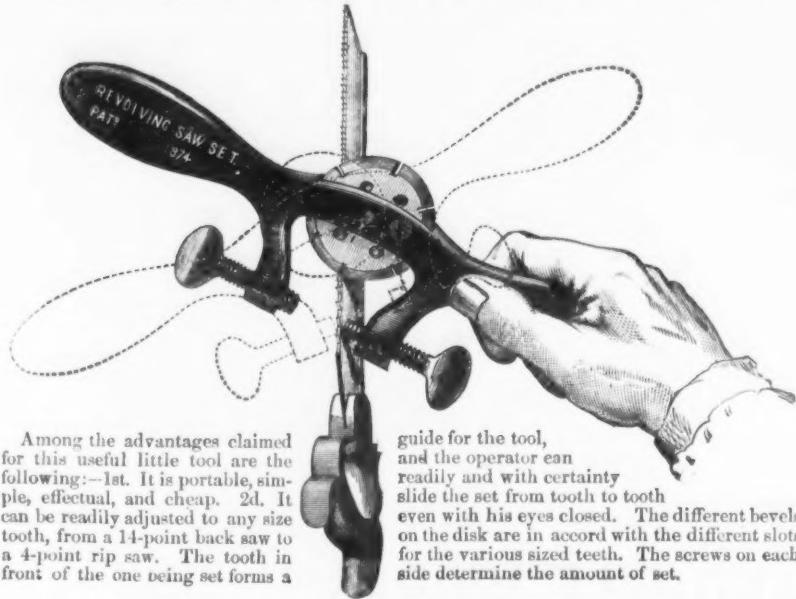
OUR WARRANTY, AND WHAT IT MEANS.

All goods marked "Disston" are Warranted. If found defective in any particular they may be returned to us, and new goods will be given in exchange for them.

We take pleasure in extending to foreign visitors to the Centennial, as well as to representatives of the home trade, and all interested in the use or sale of such goods as we make, an invitation to inspect our works and warerooms. They are easy of access from any part of Philadelphia, and we think they will be found of interest as representing the progress and present condition of the art of tool manufacture in the United States.

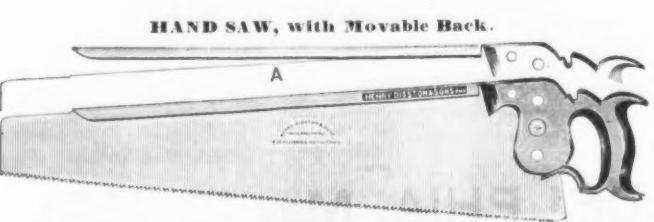
HENRY DISSTON & SONS.

HENRY DISSTON & SONS' PATENT REVOLVING SAW SET.

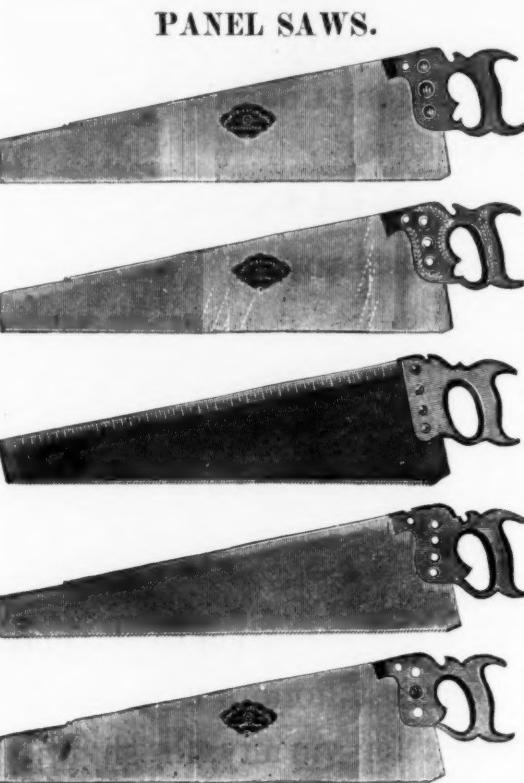


Among the advantages claimed for this useful little tool are the following:—1st. It is portable, simple, effectual, and cheap. 2d. It can be readily adjusted to any size tooth, from a 14-point back saw to a 4-point rip saw. The tooth in front of the one being set forms a

guide for the tool, and the operator can readily and with certainty slide the set from tooth to tooth even with his eyes closed. The different bevels on the disk are in accord with the different slots for the various sized teeth. The screws on each side determine the amount of set.



This Saw can be used with equal facility for either a Hand or Back Saw. When the back *A* is removed the Saw can be used as a Hand Saw. Replace the back, and a first-class Back Saw is the result.



KEY HOLE SAW AND PAD, Very Cheap and Good.



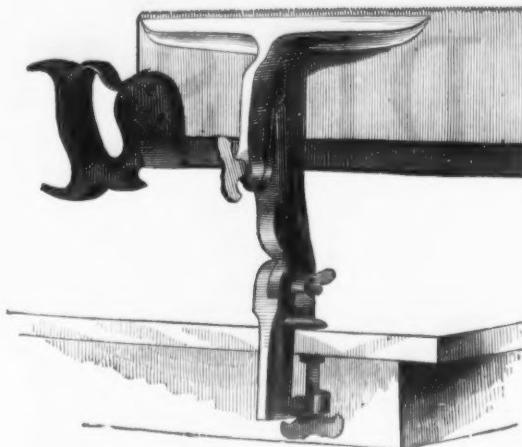
Compass Saws with Keystone Tooth, as per engraving above, for both ripping and cross-cutting, 10 per cent. extra.



These Saws are admirably adapted to Plumbers' use, where blades are frequently broken, as they can be immediately substituted in the same handle at trifling cost.

They will also be found a great acquisition to the Gentleman's Tool Chest, the three blades readily interchanging in the same Handle. The large blade can be used as a Table or Pruning Saw, and the smaller ones as Lock, Compass or Keyhole Saws.

IMPROVED UNIVERSAL SAW CLAMPS.



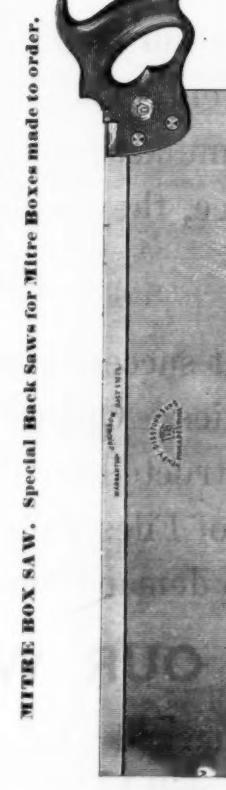
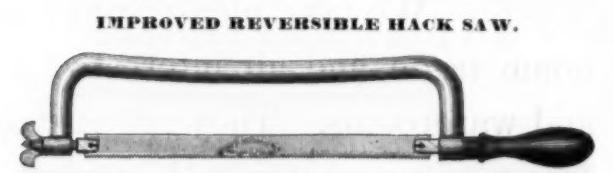
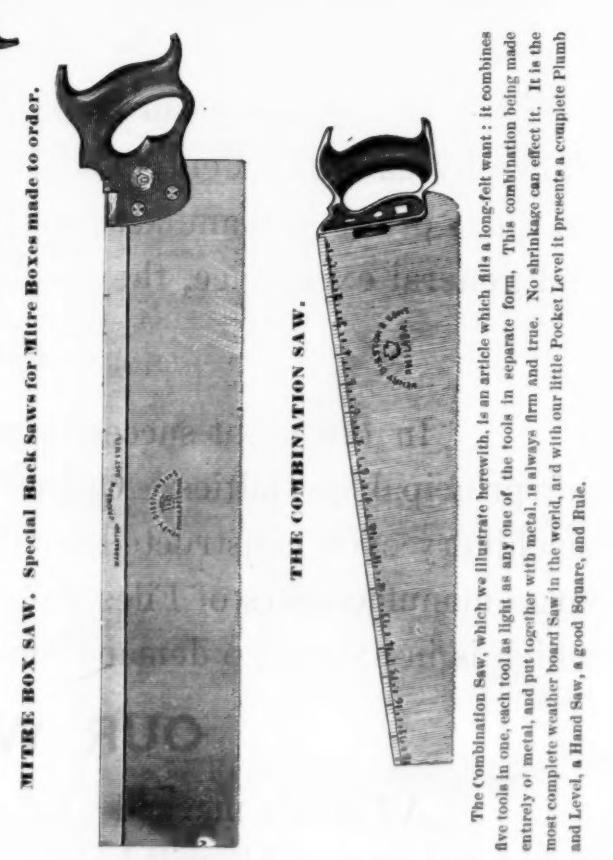
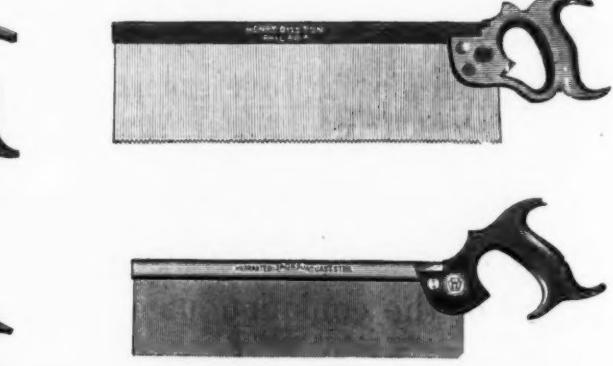
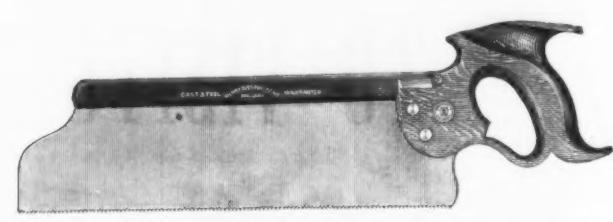
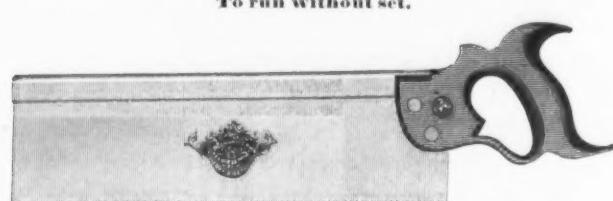
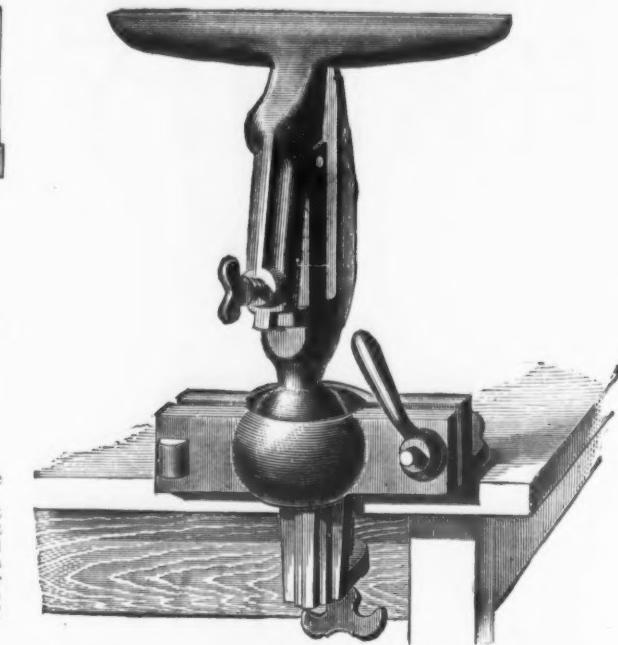
The above engravings represent new style saw clamps, by the use of which the teeth of a saw can be filed on any desired angle. Experience has demonstrated that a fast cutting cross-cut hand saw must have deep teeth. To make them deep, they must be filed on an angle. To do this to advantage, the clamp should be set to the desired angle, and a deep gullet tooth can, by this means, be filed quite as readily as a square bottom tooth. Another great advantage to be derived from this mode of filing is, that the teeth can be set more easily and with considerably less risk of breaking.

DISSTON'S IMPROVED PRUNING SAW AND KNIFE.

Patented August 29, 1873.



BUTCHERS' BOW BACK SAWS.



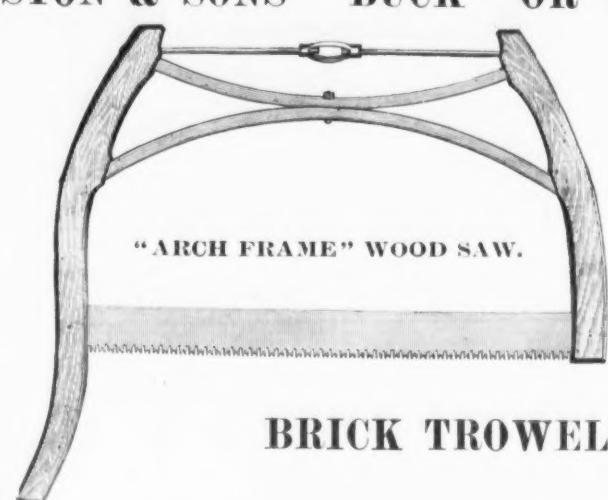
The Combination Saw, which we illustrate herewith, is an article which fills a long-felt want: it combines five tools in one, each tool as light as any one of the tools in separate form. This combination being made entirely of metal, and put together with metal, is always firm and true. No shrinkage can effect it. It is the most complete weather board Saw in the world, and with our little Pocket Level it presents a complete Plumb and Level, a Hand Saw, a good Square, and Rule.

"DISSTON" SAWS are Warranted.

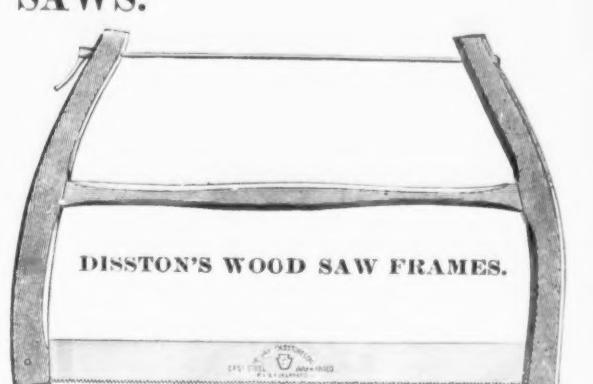
HENRY DISSTON & SONS' "BUCK" OR WOOD SAWS.



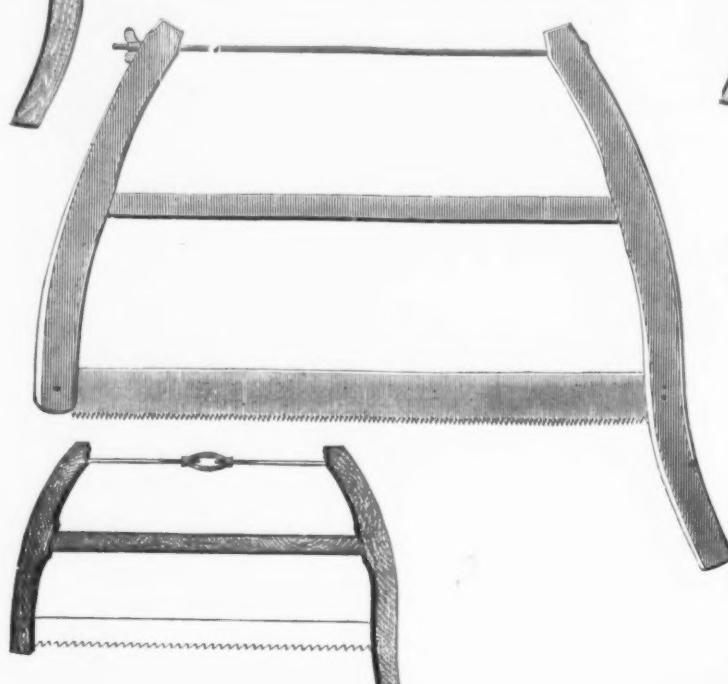
CLIMAX BUCK SAW.



“ARCH FRAME” WOOD SAW.



DISSTON'S WOOD SAW FRAMES.



WARRANTED CAST STEEL CANE KNIVES.



MOULDERS' TOOLS.

A practical moulder superintends the manufacture of these goods, which are made from the best quality cast steel, perfectly tempered, and warranted.

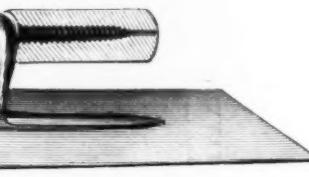


PLASTERERS' TROWELS.

BRICK TROWELS.

A practical moulder superintends the manufacture of these goods, which are made from the best quality cast steel, perfectly tempered, and warranted.

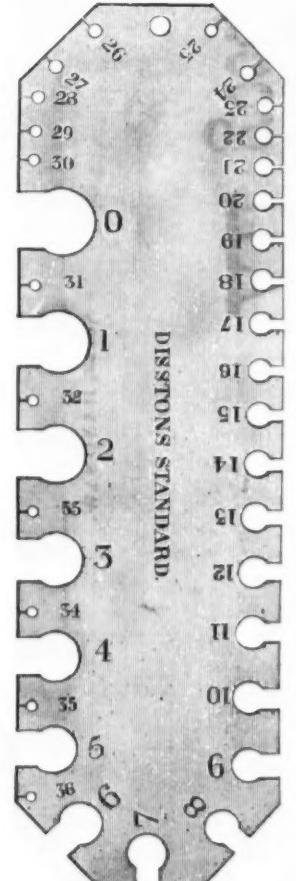
Improved Iron Frame Mitre & Square.



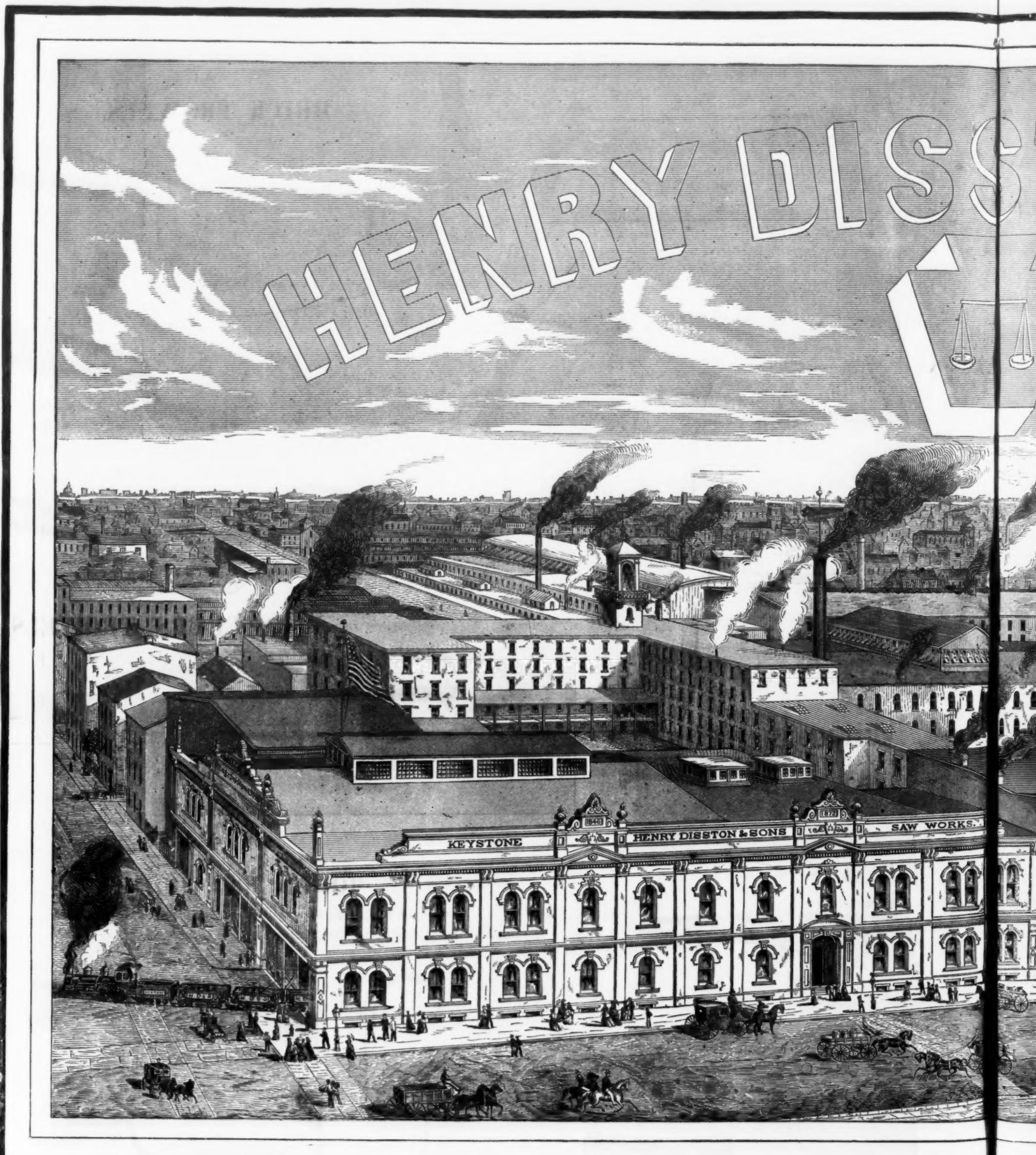
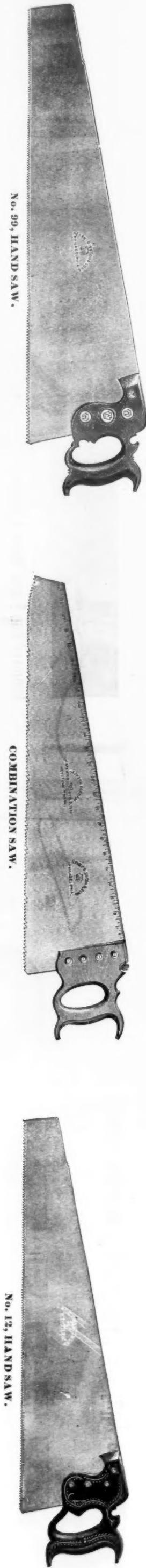
MOON KNIFE FOR CURRIERS.



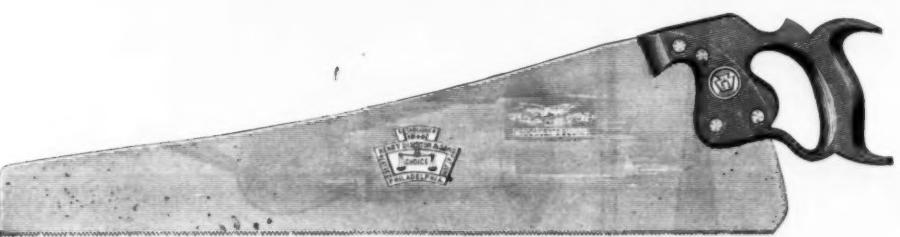
All goods marked "DISSTON" are fully guaranteed.



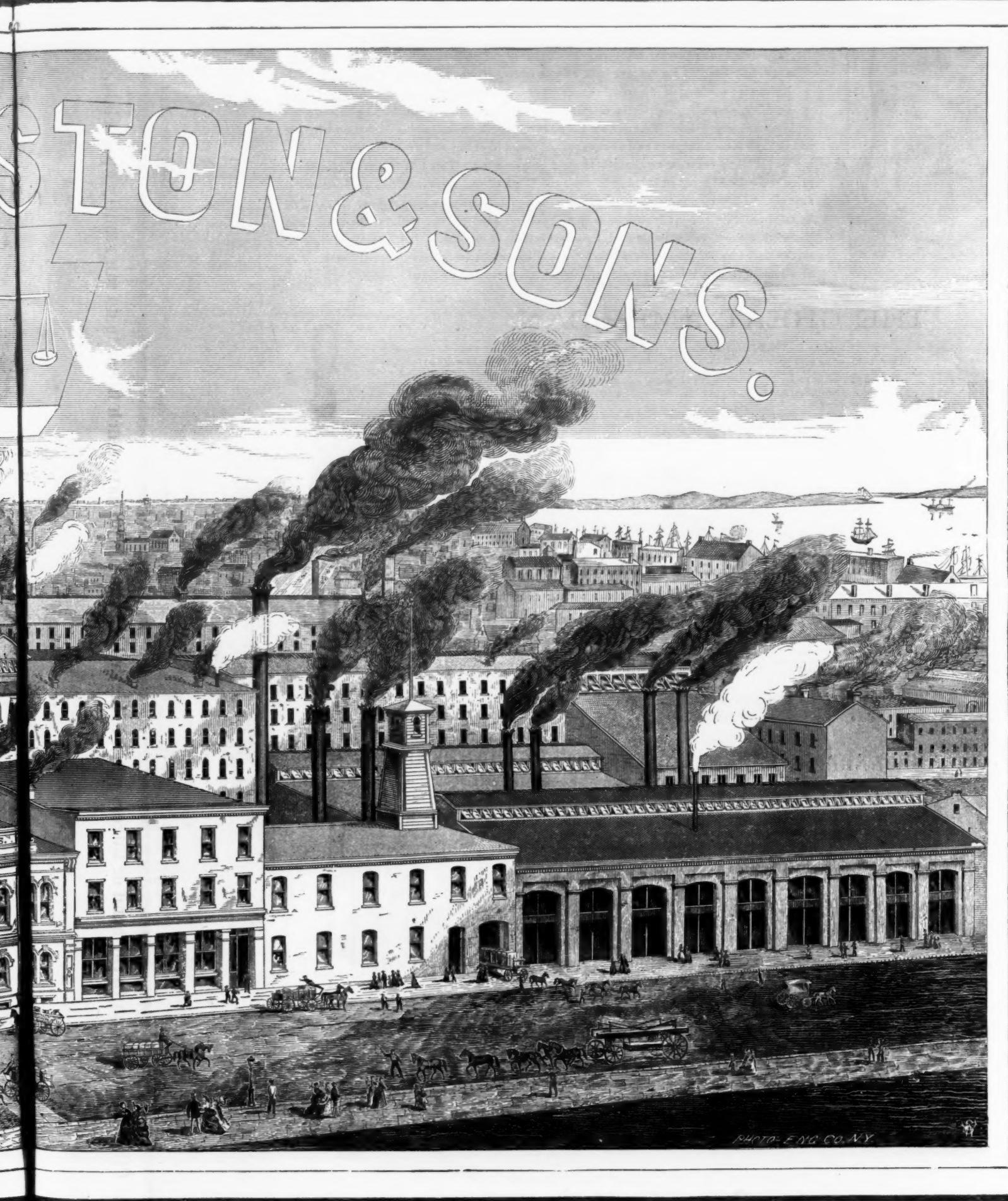
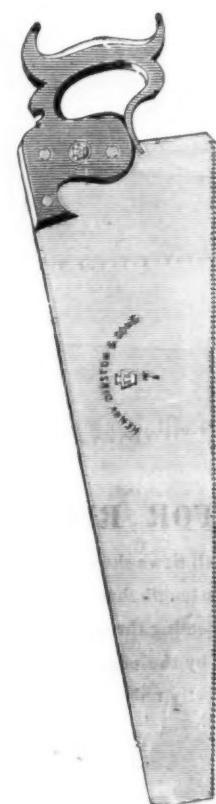
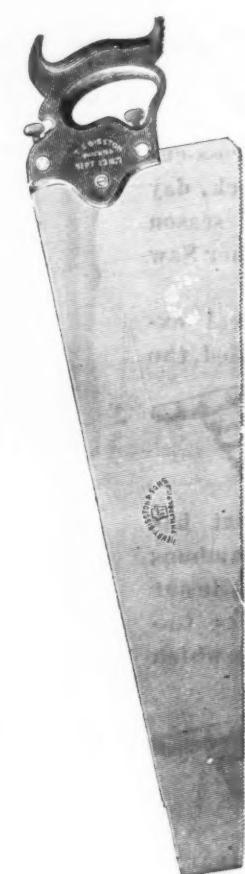
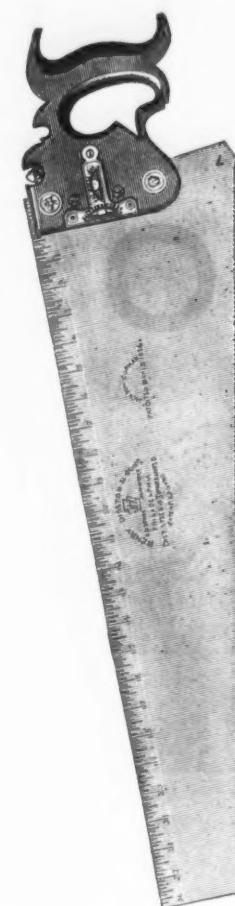
All goods marked "DISSTON" are fully guaranteed.



HENRY DISSTON & SONS' PATENT



It is singular, yet true, that although immense improvements have been made, late years, these new saws still much resemble the Hand Saws of centuries ago. We have recently patented a Hand Saw which we believe to be easier to handle, stronger in proportion to the amount of metal in the blade, and more free from vibration than ordinary handles, which possess many advantages over the old style.



TENT SKEW BACK HAND SAWS.



TENT No. 76."

de late years, in the grinding, temper, and finish of Hand Saws, still in shape and style they we believe combines numerous advantages over the old-style Saw, being lighter and more from tremor when in use than the ordinary Hand Saw. To these Saws are attached our new patent

Any Saw marked "DISSTON" proving defective will be exchanged.

ATTENTION! HALT!!

IMPORTANT to Hardware Dealers, Lumbermen, and all Parties interested in

CROSS-CUT SAWS.



DISSTON & SONS

**Read,
Mark,
Learn.**



We guarantee our Cross-cut Saws to do more work, day in and day out, the season through, than any other Saw in the market.

The test of practical experience has been applied, the



verdict given, the flat has gone forth, and the Humbugs are fast fizzling out, while our rapidly-increasing sales testify to the estimation in which these Saws are held.



We pledge ourselves that no effort shall be wanting to keep up the standard and reputation of our manufacture.



GAUGE FOR REGULATING CLEANING-TEETH.

The Cleaning-Teeth of all Saws should be somewhat shorter than the Cutting-Teeth, and, although shortened, they should be of uniform length throughout. The inner edge of the Gauge rests on the points of the Cutting-Teeth, the Cleaning-Teeth projecting through the opening in centre of Gauge. Reduce the projecting points by means of a File, until arrested by the edges of the Gauge, which is made of hardened steel. Thus Tooth after Tooth can be rapidly and correctly reduced to an even length by any unskilled operator.

The annexed engraving represents a section of "Lumberman" Cross-cut Saw, with File specially adapted for keeping said Saw in order. By using the File here illustrated, with the edge made to fit the gullet or space between the Teeth, and pressing downward while filing, you will preserve the original shape of the Teeth as described by dotted lines and notch in engraving. You pay for the edge of the file as well as the flat—then why not use it? and thus keep your Saw always gummed and in order, and avoid the risk of breaking or buckling the Saw by the old method of gumming. This File is manufactured expressly for the purpose of keeping in order the Teeth of our Improved Saws known as the Climax and Lumberman, and can be used with equal facility on either Saw. If the File be used according to our instructions, viz.: pressing down in the gullet at the same time the edge of the Tooth is being filed, the effect will be so convincing that persons will never return to the use of the old-style File, or any other of the so-called Improved Teeth. We also manufacture a File for keeping the Great American and Climax in order.

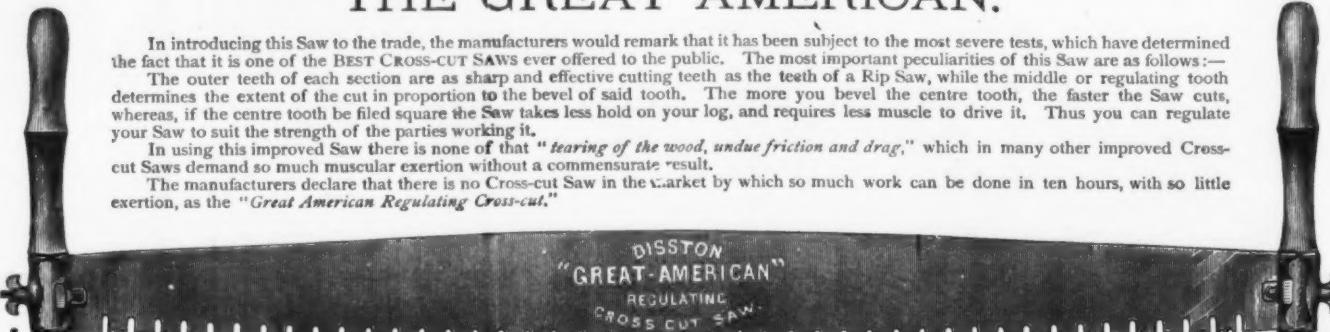
THE GREAT AMERICAN.

In introducing this Saw to the trade, the manufacturers would remark that it has been subject to the most severe tests, which have determined the fact that it is one of the BEST CROSS-CUT SAWS ever offered to the public.

The outer teeth of each section are as sharp and effective cutting teeth as the teeth of a Rip Saw, while the middle or regulating tooth determines the extent of the cut in proportion to the bevel of said tooth. The more you bevel the centre tooth, the faster the Saw cuts, whereas, if the centre tooth be filed square the Saw takes less hold on your log, and requires less muscle to drive it. Thus you can regulate your Saw to suit the strength of the parties working it.

In using this improved Saw there is none of that "tearing of the wood, undue friction and drag," which in many other improved Cross-cut Saws demand so much muscular exertion without a commensurate result.

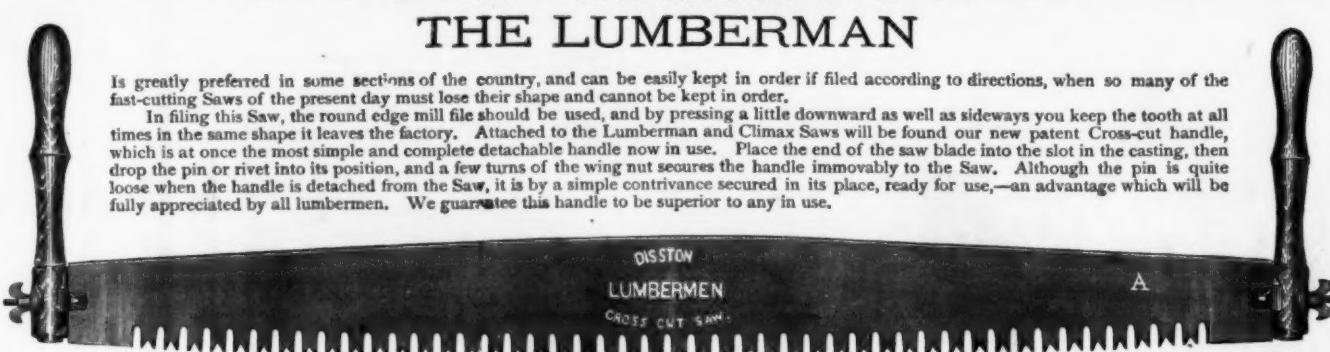
The manufacturers declare that there is no Cross-cut Saw in the market by which so much work can be done in ten hours, with so little exertion, as the "Great American Regulating Cross-cut."



THE LUMBERMAN

Is greatly preferred in some sections of the country, and can be easily kept in order if filed according to directions, when so many of the fast-cutting Saws of the present day must lose their shape and cannot be kept in order.

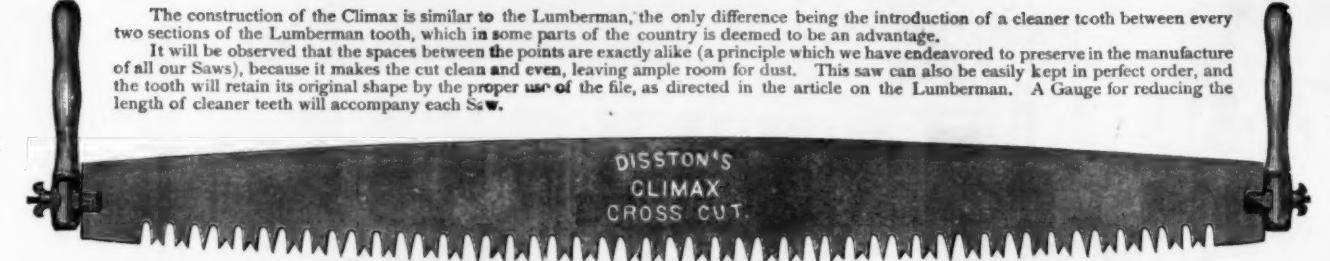
In filing this Saw, the round edge mill file should be used, and by pressing a little downward as well as sideways you keep the tooth at all times in the same shape it leaves the factory. Attached to the Lumberman and Climax Saws will be found our new patent Cross-cut handle, which is at once the most simple and complete detachable handle now in use. Place the end of the saw blade into the slot in the casting, then drop the pin or rivet into its position, and a few turns of the wing nut secures the handle immovably to the Saw. Although the pin is quite loose when the handle is detached from the Saw, it is by a simple contrivance secured in its place, ready for use—an advantage which will be fully appreciated by all lumbermen. We guarantee this handle to be superior to any in use.



THE CLIMAX.

The construction of the Climax is similar to the Lumberman, the only difference being the introduction of a cleaner tooth between every two sections of the Lumberman tooth, which in some parts of the country is deemed to be an advantage.

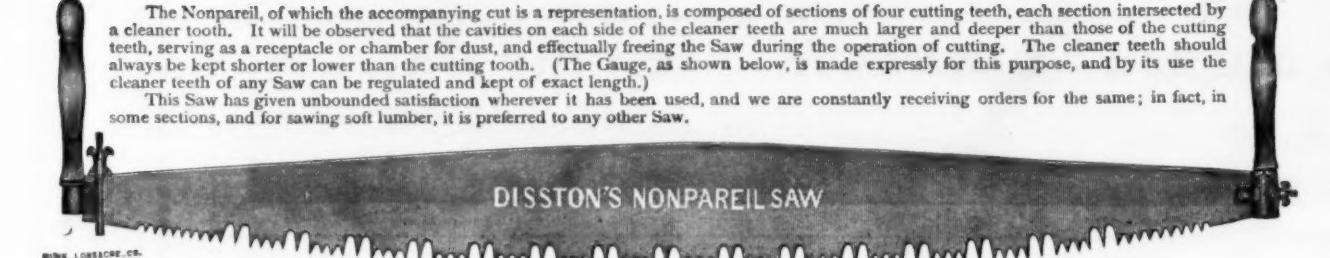
It will be observed that the spaces between the points are exactly alike (a principle which we have endeavored to preserve in the manufacture of all our Saws), because it makes the cut clean and even, leaving ample room for dust. This saw can also be easily kept in perfect order, and the tooth will retain its original shape by the proper use of the file, as directed in the article on the Lumberman. A Gauge for reducing the length of cleaner teeth will accompany each Saw.



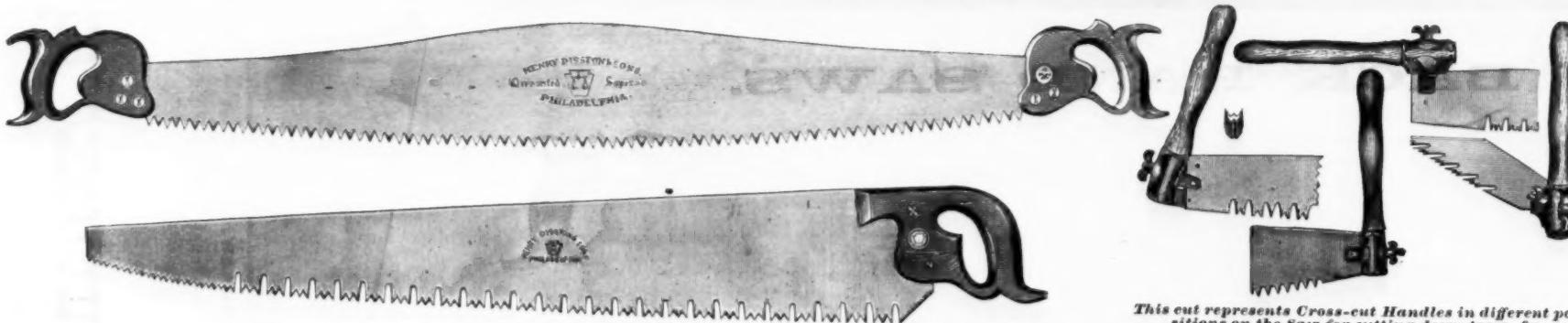
THE NONPAREIL.

The Nonpareil, of which the accompanying cut is a representation, is composed of sections of four cutting teeth, each section intersected by a cleaner tooth. It will be observed that the cavities on each side of the cleaner teeth are much larger and deeper than those of the cutting teeth, serving as a receptacle or chamber for dust, and effectively freeing the Saw during the operation of cutting. The cleaner teeth should always be kept shorter or lower than the cutting tooth. (The Gauge, as shown below, is made expressly for this purpose, and by its use the cleaner teeth of any Saw can be regulated and kept of exact length.)

This Saw has given unbounded satisfaction wherever it has been used, and we are constantly receiving orders for the same; in fact, in some sections, and for sawing soft lumber, it is preferred to any other Saw.



DISSTON'S NONPAREIL SAW



This cut represents Cross-cut Handles in different positions on the Saw for cutting down trees, &c.



PATT. FEB 9th 1869.
SECTION OF
DISSTON'S NONPAREIL SAW.

SHOWING THE GAUGE IN POSITION
FOR FILING THE CLEANER
TOOTH.

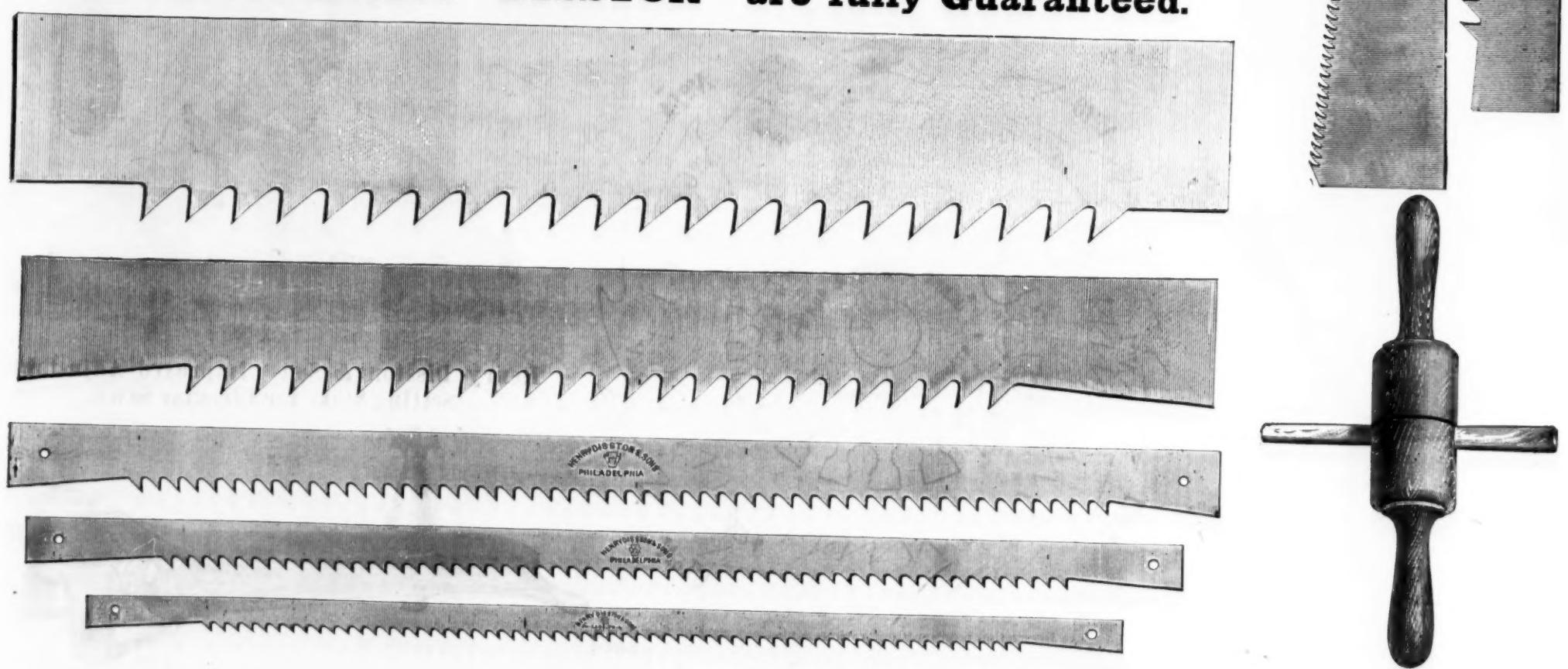
HENRY DISSTON & SONS.

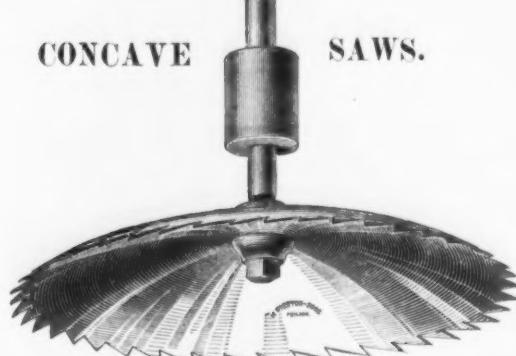
The tip on the end of File is a protection to the hand or fingers when filing, which those who have much filing to do can readily appreciate.

HENRY DISSTON & SONS' SQUARES, BEVELS, GAUGES, Etc.

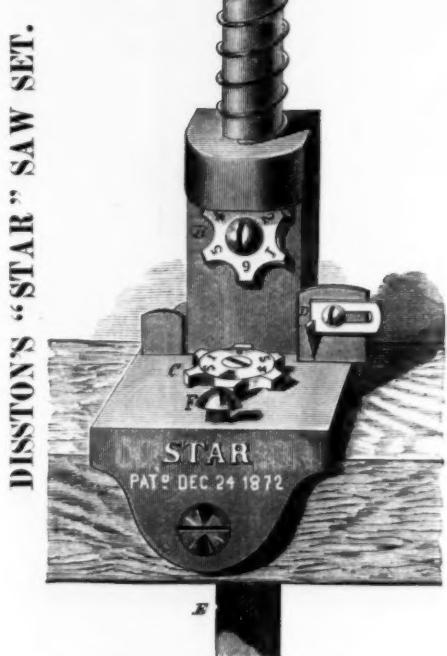
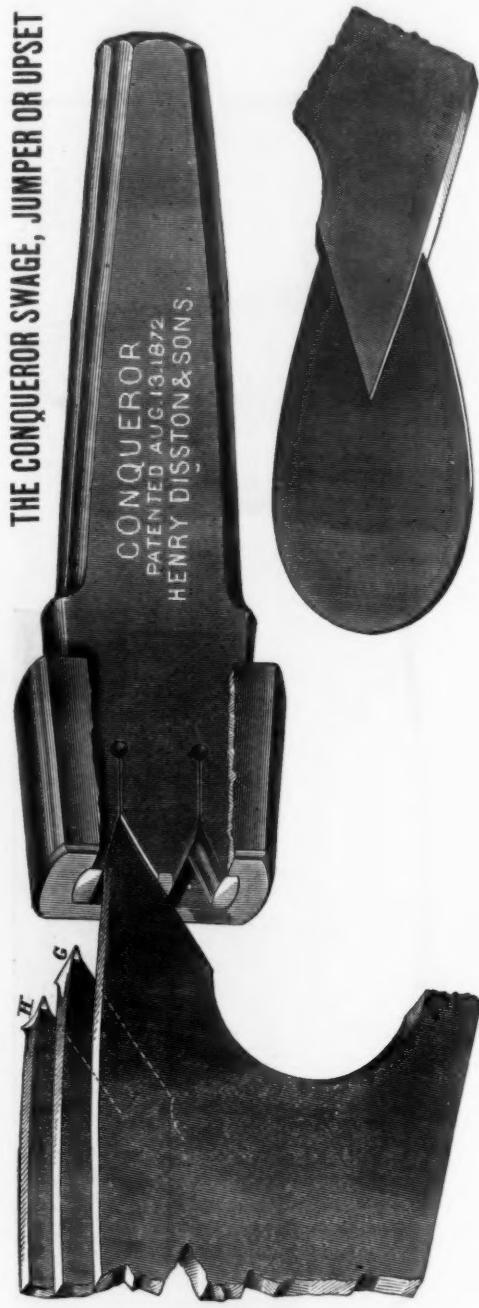


All goods marked "**DISSTON**" are fully Guaranteed.





The attention of the manufacturers of chair or wheelwright lumber, barrels, etc., is respectfully called to Concave Saws, of which we are manufacturing large quantities. They are dished and tempered by an entirely new and patented process, and guaranteed to be of superior quality in every respect. We furnish these Saws considerably cheaper in consequence of our new mode of manufacture.



A is the plunger, which is operated by a treadle attached to E, under the machine; B, the hammer or striking part; C, the anvil; D, the movable gauge; F, the screw, to regulate the amount of set.

The striking part and the anvil, or portion which receives the blow, are star-shaped and similar in construction. The points are all of different sizes, and are numbered from 1 to 6; and are designed to set different size teeth. Prominent among its advantages is the fact that it can be operated wholly by the foot by means of a treadle, thus leaving the hands to guide and manipulate the saw.

Disston's Patent Gullet-Tooth Circular Saw.

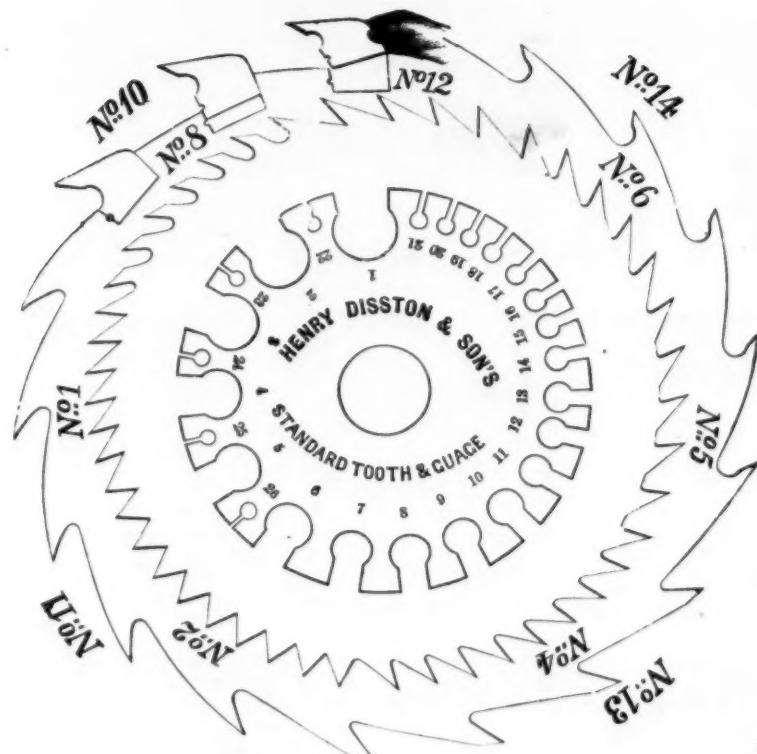
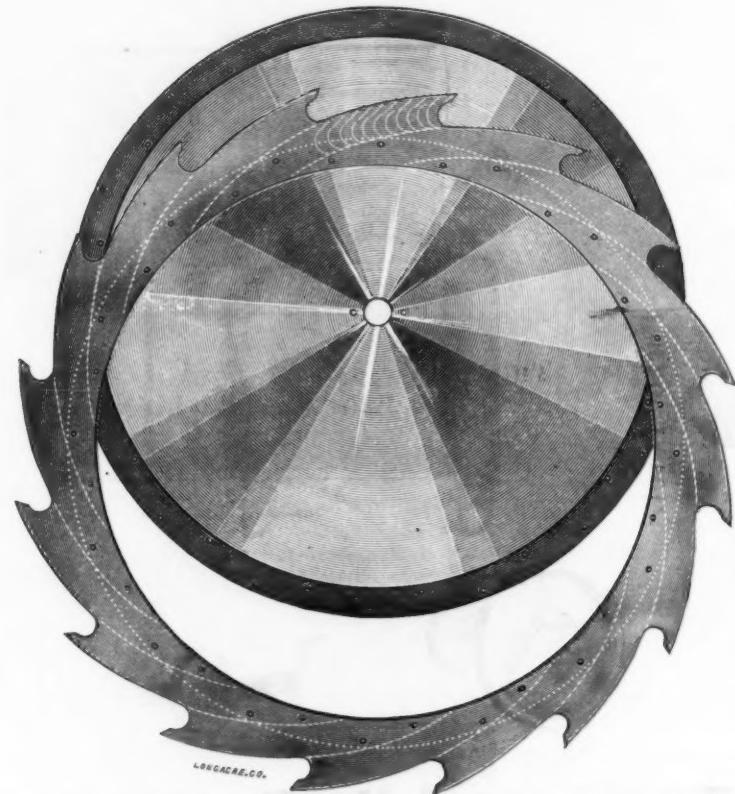


By reference to the above engraving, it will be observed that the back or point line of each Tooth is the continuation of the spiral lines Z, and the sharpening is mainly done by the reduction of the Gullet or Throat only. This is readily accomplished by the use of our Patent Gummars.

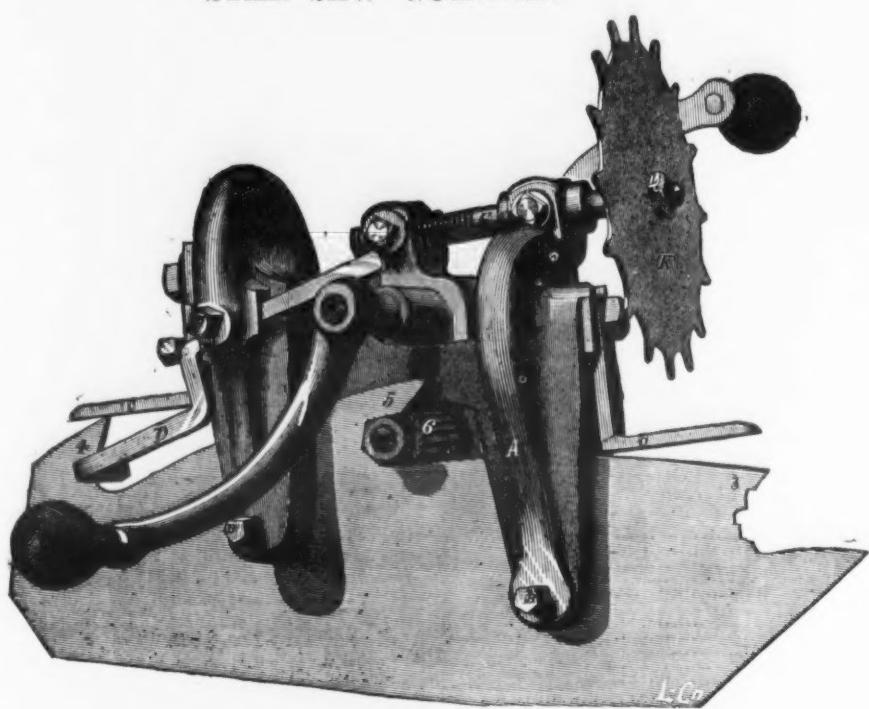
The course pursued by the cutter is spiral, and while it is in the act of reducing the front or throat of the Tooth D, it is prolonging the back or point-line of the Tooth C. The engraving represents a two-inch tooth or Gullet. The Saw B is the Saw A worn down. When the Saw has been reduced on center line from G to F, it has been worn away but six inches, yet has presented a cutting surface on spiral line Z from G to Y, a distance of twenty-four loches. But this is only one of the advantages claimed for our Patent Gullet-Tooth. The Throat or Gullet being chambered out on a half-circle, forms a receptacle or chamber for dust, and thus a one-and-a-half-inch tooth of this pattern will keep a Saw as free from clogging as a two-inch tooth in the ordinary shape.

The saving of the Saw-Plate by the use of a smaller tooth is evident to the most casual observer. In wearing a fifty-four-inch Saw down to a forty-two, a loss of twelve inches has been sustained in the diameter of the Saw-Plate, which is six sets of two inch Teeth, or eight sets of one-and-a-half-inch Teeth, an advantage of two sets in favor of our new Patent Gullet-Tooth, independent of the immense gain by gumming on spiral lines. The crowning triumph of this Saw is the fact that it can be kept in order with one-tenth the labor of any other Saw, and is bound to preserve its true circular shape; whereas, by the old method of filing both on back and front it is impossible to keep a Saw round.

RIM SAW.



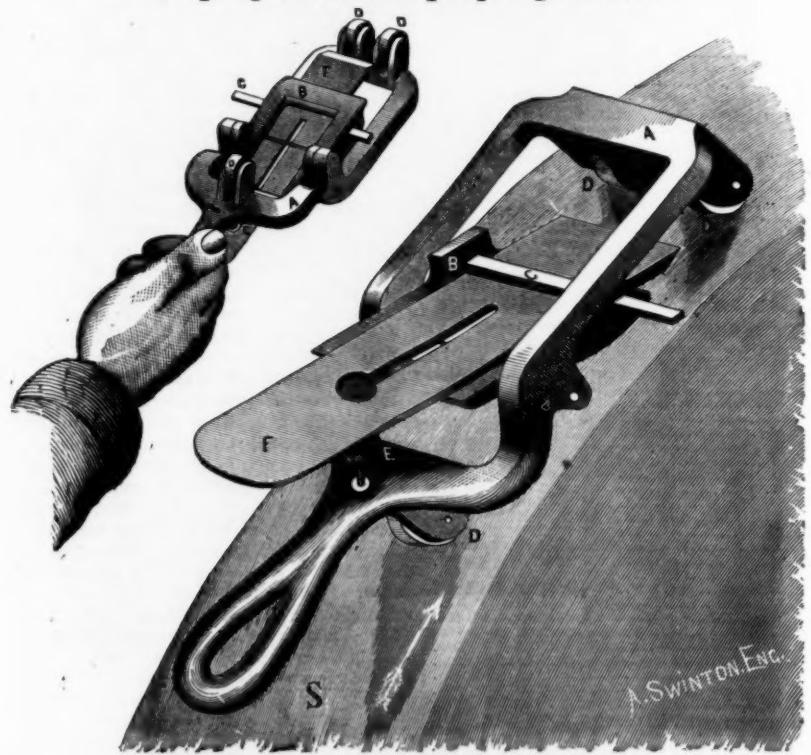
STAR SAW GUMMER.



Frame for holding a Gummer Cutter while being ground.



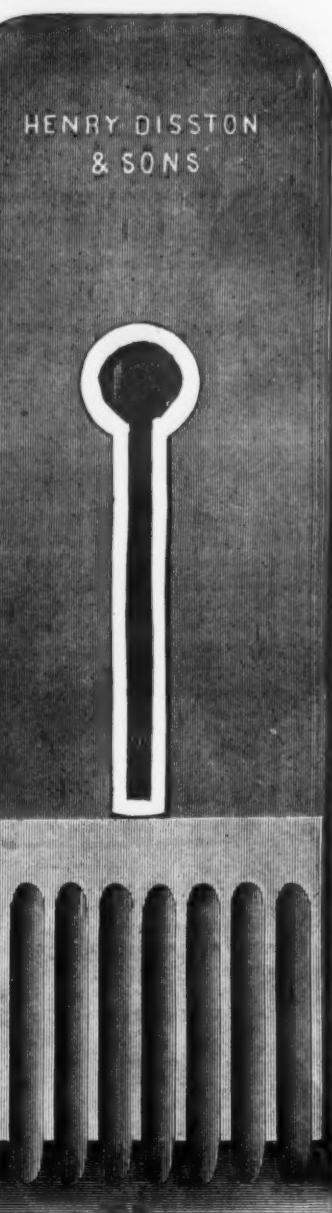
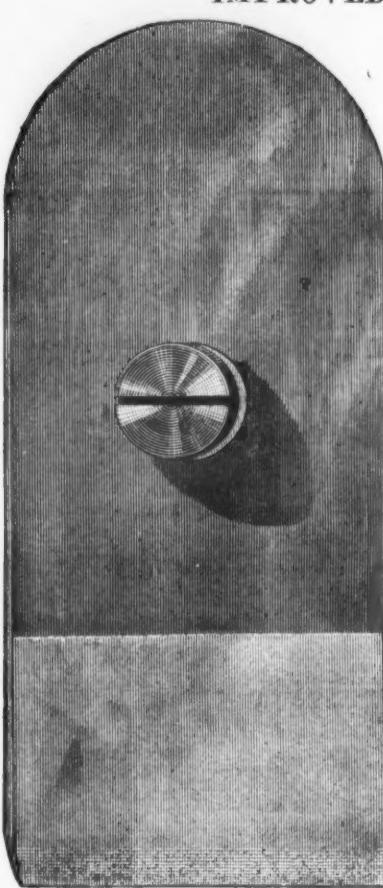
Frame for holding a Plane Bit while being ground, keeping the bit in proper position.

HENRY DISSTON & SONS'
Patent Setting StakeFor Setting Web, Jig, Band or any
kind of Narrow Saws.

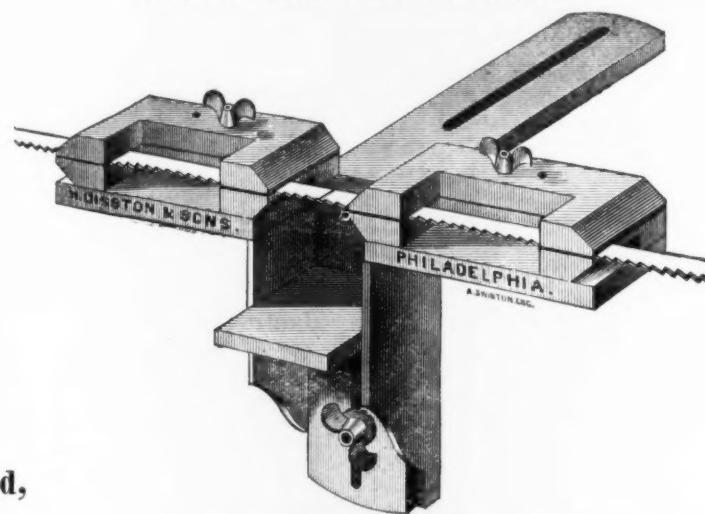
The principal difficulty experienced in setting a narrow saw arises from the fact that the blade is liable to tilt or slide backward as each successive tooth is struck by the hammer. The back guide with its projecting lip, under which the saw passes and is securely held during the process, effectually prevents these difficulties and holds the saw up to its work; thus the operator is enabled to strike the teeth with certainty every time, and prevents any distortion of the saw blade.

This guide can be adjusted to various widths, by inserting or removing packing, as occasion may require. Either edge of the set can be used by reversing the back guide, and as the edges are of different sizes, they are adapted to saws of different widths. A narrow saw set by the aid of this Stake remains as straight after as before; a result which cannot be attained by any other means.

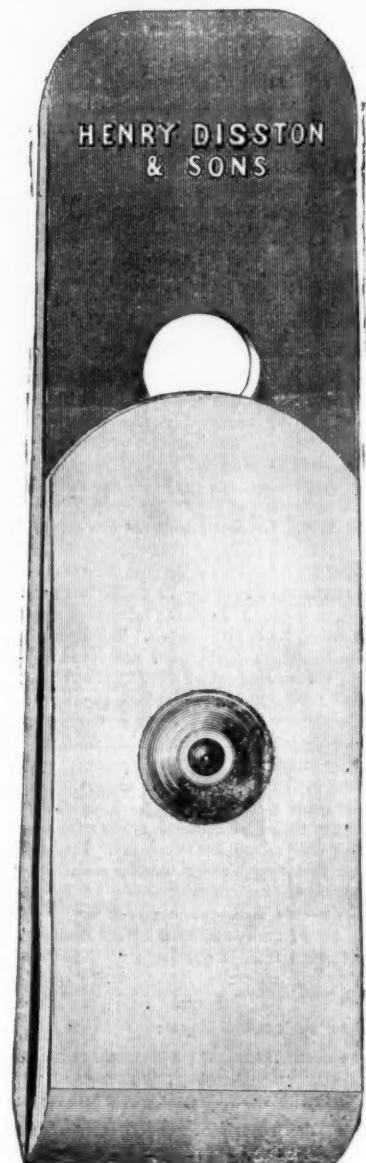
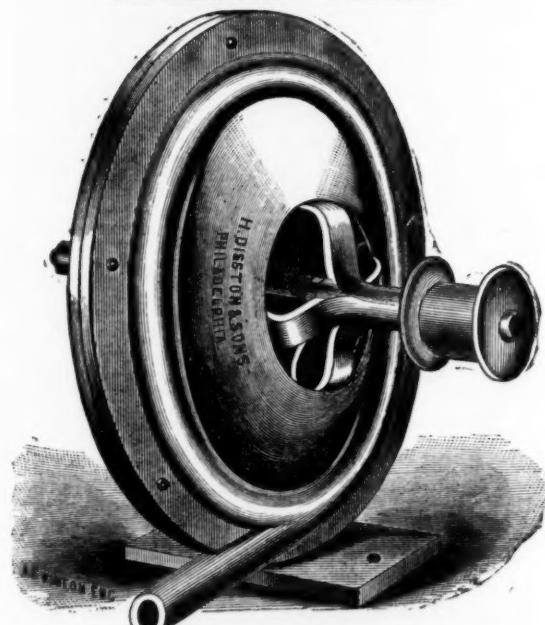
IMPROVED PLANE BITS.



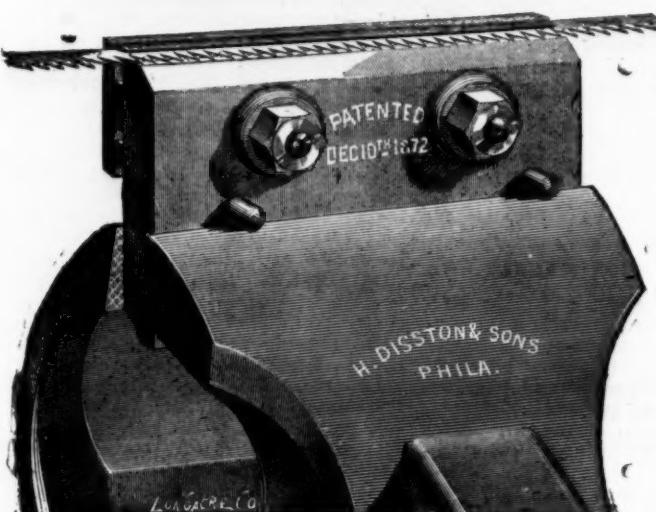
This cut represents a machine for Brazing Band Saws 2 inch wide and under.



This cut represents a small Blower for Band Saw Machine.



Side File.



Trade Report.

Office of THE IRON AGE,
WEDNESDAY EVENING, MAY 10, 1876.

The past week has been one of very moderate activity in Wall street, owing to the absence of a speculative disposition among the leading spirits of the several markets. Money is abundant and easy. Borrowers on call have been freely accommodated at 3½ @ 4 per cent., and the rate of discount for prime business paper is 4½ @ 6 per cent. Business of all kinds is suffering from an almost unprecedented dullness, and several heavy failures have been reported—notably among New England manufacturers of cotton cloths. The opinion prevails that we are now passing through the period of greatest dullness and depression immediately preceding a recovery of individual and commercial activity. This may be true, but we fail to discover indications of immediate improvement, unless such improvement shall result from the Centennial. There are many reasons to think that this will help all kinds of business to a moderate extent, and set a great deal of money in circulation, but there seems to be very little prospect of a general and healthy revival until after the presidential canvas. The currency question is now in good shape, and if the results of the fall elections are not such as to involve the future of financial legislation in uncertainty, we may consider ourselves as steadily tending in the direction of specific payments. This is the only solution of our paper money difficulties in which the country would feel any degree of confidence, and no party can hope to carry the country which does not squarely and honestly pledge itself to honor all our national obligations in coin or its equivalent. As a political issue currency inflation is a thing of the past, and there is no reason to think that it will have weight in national politics.

The gold market has been very steady during the week, and the fluctuations in the premium have been between 12½c. and 12¾c. The following table shows the highest and lowest daily quotations in the gold room :

| Highest. | Lowest. |
|----------------|---------|
| Thursday..... | 112½ |
| Friday..... | 112½ |
| Saturday..... | 112½ |
| Monday..... | 112½ |
| Tuesday..... | 112½ |
| Wednesday..... | 112½ |

On Friday the Secretary of the Treasury gave orders to pay out subsidiary silver coin for currency drafts. The effect of this was to completely remove all present danger of a scarcity of "change," and silver, which had been worth a premium, at once fell to par.

There has been a moderate activity in government bonds during the week, and prices have been quite steady. Investment securities of all kinds are dull and steady, especially railroad securities.

The stock market, which at the date of our last report was somewhat depressed, has been unsettled and feverish on account of the breaks in railroad freights and telegraph charges, and the illness of Mr. Vanderbilt. The principal dealings have been in Lake Shore, Western Union, Michigan Central, St. Paul, Pacific Mail, New York Central and Erie.

The following is a comparison of the bank averages for the past two weeks :

| April 29. | May 6. | Differences. |
|-----------------------------|--------------|----------------|
| Loans..... | \$32,117,500 | \$257,015,600 |
| Specie..... | 17,000,000 | 19,500,000 |
| Legal tend. &c. 109,300,000 | 29,182,200 | Inc. 2,227,800 |
| Deposits..... | 202,530,100 | 206,669,000 |
| 16,262,800 | 16,199,400 | Dec. 3,139,900 |
| | | 68,400 |

The changes above noted are chiefly due to the Treasury operations in connection with the payment of the adjusted claims under the Geneva award. Although the \$5,883,000 five per cent. bonds sold by the Treasury to procure the means wherewith to pay, were sold for gold April 24, they were not paid for until April 27—the same day on which the gold was sold for currency; the buyers of this gold had four days in which to pay for it, so that the effect on the bank figures was apparent in the last bank week—which began Saturday morning, April 29, and ended Saturday, the 6th. The Treasury has been taking in legal tender notes and paying out gold on account of the \$8,883,000 bond operation. In addition it has been paying out gold for May interest, and it is probable that the New York banks hold actually more gold than they appear to by this statement, even making allowance for to-day's export, which does not count in this week's bank statement, and for the ordinary customs receipts paid from the bank vaults into the Treasury. It is also probable that they hold a smaller amount of legal tender notes than they appear to by this statement—this although currency has been coming here from the interior during the week.

The foreign trade movements are shown in the following tables :

| IMPORTS. | |
|-------------------------------|-------------|
| For the week ended May 6: | |
| 1874. 1875. 1876. | |
| Total for week... \$6,515,037 | \$5,667,935 |

Prev. reported... 144,711,176

Since Jan. 1... \$151,290,213

133,181,604

+\$16,778,481

Among the imports of general merchandise were articles valued as follows :

| Quant. | Value. |
|-------------------------|----------------|
| Brass goods..... | \$4,283 |
| Bronzes..... | .89 3,906 |
| Chains and anchors..... | .29 390 |
| Cutteries..... | .1 10,045 |
| Guns..... | .10 3,188 |
| Hardware..... | .10 1,359 |
| Iron, pl. tons..... | 850 19,584 |
| Iron, castings..... | 350 1,000 |
| Iron ore, tons..... | 155 2,935 |
| Iron, other tons..... | 68 4,754 |
| Lead, pigs..... | 1,590 10,171 |
| Metal goods..... | .197 18,26 |
| Nails..... | .8 744 |
| Needles..... | .7 2,957 |
| Old metal..... | .17 7,179 |
| Saddlery..... | 1,805 25,354 |
| Stamps..... | 13,940 80,024 |
| Tin, boxes..... | 440,531 75,108 |
| Wire..... | 1,343 6,800 |

EXPORTS, EXCLUSIVE OF SPECIE.

For the week ended May 9:

| | 1874. | 1875. | 1876. |
|-------------------|---------------|--------------|--------------|
| Total for week... | \$4,454,367 | \$3,908,621 | \$5,065,313 |
| Prev. reported... | 96,345,837 | 81,236,344 | 82,636,975 |
| Since Jan. 1.... | \$100,700,204 | \$85,144,965 | \$87,702,988 |

EXPORTS OF SPECIE.

For the week ended May 6:

| | 1874. | 1875. | 1876. |
|------------------------|-----------|-----------|-------------|
| Total for week... | \$1,117,5 | \$1,117,5 | \$1,546,529 |
| Previously reported... | | | |

Total since Jan. 1, 1876..... \$1,557,704

Same time in 1875..... 5,779,146

Same time in 1874..... 1,559,673

Same time in 1873..... 1,453,482

Same time in 1872..... 639,618

Government bonds at the close were quoted as follows :

| Bid. | Asked. |
|-----------------------------|--------|
| U. S. Currency 6s..... | 127½ |
| U. S. 6s 1881, reg..... | 121½ |
| U. S. 6s 1881, con..... | 122½ |
| U. S. 5s 1881, reg..... | 114½ |
| U. S. 5s 1881, con..... | 114½ |
| U. S. 5s 1885, new reg..... | 119½ |
| U. S. 5s 1885, con..... | 118½ |
| U. S. 5s 1887, reg..... | 120½ |
| U. S. 5s 1887, con..... | 120½ |
| U. S. 5s 1888, reg..... | 124½ |
| U. S. 5s 1888, con..... | 123 |
| U. S. 10-40, reg..... | 123 |
| U. S. 10-40, con..... | 118 |
| U. S. 5s 1891, reg..... | 117½ |
| U. S. 5s 1891, con..... | 117½ |

The following were the closing quotations of active stocks :

| Bid. | Asked. |
|-----------------------------------------|-----------|
| Atlantic & Pacific R. R. Preferred..... | 3½ 3½ |
| American & Pacific Telegraph..... | 17½ 18 |
| Chicago, Rock Island and Pacific..... | 10 40 |
| Chic., Bur. & Quincy..... | 10 40 |
| Chicago, Rock Island and Pacific..... | 10 10 |
| Chi., Chic. & Ind. Cent..... | 4½ 4½ |
| Cleveland and Pittsburgh..... | 9½ 9½ |
| Chicago & Alton..... | 97 98½ |
| Consolidation Coal..... | 10½ 10½ |
| Canton..... | 37 40 |
| Del. Lack. and Western..... | 105½ 106 |
| Delaware & Hudson Canal..... | 110 111 |
| Adams Express..... | 109½ 110½ |
| American Express..... | 62 62 |
| United States Express..... | 70½ 71 |
| Wells, Fargo & Co. Express..... | 87½ 90 |
| Fairbanks..... | 15 15½ |
| Harmar..... | 107 108 |
| Hannibal & St. Joseph..... | 14½ 15 |
| " Pref. | 24 25 |
| Illinois Central..... | 96½ 96½ |
| Kansas City..... | 10½ 11 |
| Lake Shore..... | 54½ 54½ |
| Michigan Central..... | 46½ 46½ |
| Morris & Essex..... | 103 103 |
| Milwaukee & St. Paul..... | 37½ 38 |
| Mariposa..... | 64½ 64½ |
| " Pref. | 7½ 8 |
| New York Central..... | 110 110 |
| New Jersey Central..... | 98½ 94 |
| Ohio & Mississippi..... | 18½ 17 |
| Panama..... | 20 20 |
| Portland & Fort Wayne..... | 102 102 |
| Pacific of Missouri..... | 13 13 |
| Quicksilver..... | 15½ 17 |
| St. L. Kan. City Northern..... | 5½ 5½ |
| " Pref. | 20 24 |
| Tel., Wabash & Western..... | 28 30 |
| Union Pacific..... | 61½ 61½ |
| Western Union Telegraph..... | 66½ 66½ |

The Bailey Wringing Machine Co. illustrate, in their advertisement on another page, Simpson's Adjustable Vises, for which they are agents. These goods are made by the Athol Machine Co., and we are informed that they have met with such favor since their introduction on the first of this year, that the manufacturers are obliged to run their works night and day to catch up with orders.

A. C. Downing & Co., No. 57 Beckman street, have issued the following revised list for French Window Glass, under date of 1st inst.:

| FRANCE WINDOW GLASS. | | | |
|------------------------------------|--|--|--|
| Prices current per box of 50 feet. | | | |

The following table shows the highest and lowest daily quotations of the week :

| GENERAL HARDWARE. | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| We cannot report any improvement in business, and no changes of importance have occurred in quotations during the week. In Foreign Hardware trade seems even more depressed than in domestic goods, but it being pretty generally conceded that prices have touched bottom, no disposition is manifested on the part of importers to force sales by concession. | |
| J. Clark Wilson & Co. quote D. H. Whitemore's Apple Pares, improved for 1876, at the following net prices: | |
| Bay State..... per doz. \$13½ | |
| Skeleton..... " | 8½ |
| Union..... " | 8½ |

We print on page 19 an article illustrating these goods, to which we invite attention.

they, if we take a five or six week's leave of absence we could spend eighteen to twenty days on the forward and return voyages, and have ample opportunity, not only to look over the Centennial and its contents, but to run over to Niagara, and other show places before returning. I can assure you that I hear of many such trips being in contemplation, and that were it not for my business engagements I should certainly make the journey myself. We know here, and you hardly need reminding of the fact, that we look upon the United States as another England—as a country where almost every family here has one tie, or it may be many, of affection or blood. We are proud of America—from Canada, southwards—and we feel that in you there is the germ of the mightiest nation of the world. Setting aside what some people may be inclined to term patronizing sentimentality, we are very closely connected with you by strong trading ties, and we shall send you a few "head drummers" this summer with express orders to operate upon you in the most scientific manner with a view of extracting orders. Mr. Mark Firth, Mayor of Sheffield, and head of the great steel firm of Firth & Sons, leaves for America this week, and other well-known Sheffield gentlemen—manufacturers, clergymen, and others are making similar preparations. Mr. Firth, I hear, takes a splendid sample case with him—whatever his intentions therewith may be. If it were not for "that infernal tariff"—but no matter!

ANOTHER DYNAMITE CATASTROPHE.

If matters go on as they are doing for any length of time, we shall soon be relieved of our surplus population, and may thereafter be enabled to recommend Great Britain as a suitable field for immigrants. As a matter of fact, dynamite is altogether too irrepresible to be long retained on our list of useful explosives. Gunpowder can be dealt with, and feel comparatively safe, but no man within half a mile of a dynamite store, or even a single cartridge, can with confidence reckon upon containing within his mortal coil. The latest case in point is furnished by an affair which took place early on Saturday morning, within a few miles of Neath, Glamorganshire, South Wales. At tide place, called Cymmer, a railway tunnel was being cut through a hard limestone rock, and both powder and dynamite were being made use of. There were three headings, each containing between thirty and forty men. It is said that one of the workers, inadvertently struck a match wherewith to light his pipe, and that the explosion ensued therefrom. At all events, there was a most terrific explosion, the result being that fifteen men were blown to pieces and fifteen others very badly maimed. One poor boy was literally blown into shreds. Much of the rock was also shattered, and the work in hand was utterly destroyed. After this it is highly improbable that smoking will be in vogue with those who are seated on dynamite stores.

A SWIFT TROOP SHIP.

The British government is evidently not bent upon placing all its eggs in one basket, or, in other words, in relying solely upon huge ironclads. They are having a number of small, but swift, vessels built for the purpose of carrying dispatches, or annoying merchantmen, in case of war. Two of this class, the *Torquise* and the *Ruby*, with two gunboats, are being constructed by Earle's Shipbuilding Company, at Hull, the *Torquise* being now ready for launching. This vessel is 220 feet long between perpendiculars, and 40 feet 1 inch broad. She is built after the fashion of the American clippers, is divided into 20 water-tight compartments, and will carry 13 muzzle loading rifled 64 pounder guns on the upper deck, besides two smaller guns for boat service and torpedo firing apparatus. The poop and forecastle are deeply embrasured, to admit of the bow and stern guns being fired fore and aft. Her engines are 2100 horse-power, and are on the horizontal, compound and return condensing principles. She will carry 200 men.

A BALLOON ACCIDENT.

Ballooning, as a science, may safely be said to be as yet in its infancy, despite the graphic illustrations of its development which have recently been set forth to an admiring world by Jules Verne. In fiction the balloon is a most convenient and clean way of getting desperate people out of still more desperate situations; but in reality it is occasionally no laughing matter to be suspended half-way between heaven—and earth. Last week, for instance, MM. D'Artols, Ganfray and Pelletier made an ascent from Marseilles about 4 o'clock on the Thursday afternoon. An hour later the balloon was seen from the village of Bonnetable to be careening about, apparently uncontrolled, at a slight distance from the ground. Inquiries being made, it was found that the three unfortunate men had been pitched out of the car, owing to the rough wind having blown the balloon into a grove of poplar trees. M. Pelletier is reported to be in a bad condition, whilst the other two gentlemen have escaped with a few broken limbs each. Enthusiastic young gentlemen who have perused M. Verne's captivating "Five Weeks in a Balloon across Africa," would, I think, do well to bear in mind facts such as the above.

A STAFFORDSHIRE FAILURE.

On Friday a petition for liquidation was filed in the local bankruptcy court by Messrs. Knowles & Co., japers and tin plate workers, of Wolverhampton. The liabilities are estimated to be about £12,000, with assets of considerable, but as yet not precisely ascertained value.

THE SCOTCH PIG IRON TRADE.

At Glasgow, as in all other districts, the iron trade remains in a very depressed condition, without automation being noticeable in any single direction. The shipments continue to be on a very limited scale, and makers' brands again show a slight decline in values. There are 62,534 tons in Connal's stores. Messrs. Wm. Colvin & Co. report a small business, and Messrs. James Watson & Co. (Glasgow, April 21st) said: "Our Scotch pig iron market has been quietly steady during the past week, warrants fluctuating between 58 4/5 and 58 1/2 cash, closing to-day buyers 58 3/4; sellers, 58 4/5 cash. Shipments last week were 11,996 tons, against 14,883 tons in the corresponding week of 1875. We quote:

| | No. 1. | No. 2. |
|--------------------------|--------|--------|
| G. M. B. at Glasgow | 59 1/2 | 58 1/2 |
| Gartshill, | 60 1/2 | 59 1/2 |
| Coltness, | 68 6 | 60 1/2 |
| Summerlee, | 65 6 | 59 1/2 |
| Langloan, | 67 6 | 59 1/2 |
| Carphoe, | 63/ | 59/ |
| Calder at Port Dundas | 68 6 | 59/ |
| Glenarnock, at Ardrossan | 65 6 | 59 1/2 |
| Eglington, | 58 6 | 57 1/2 |
| Dalmellington, | 68 6 | 59/ |
| Scotts at Leith, | 68 6 | 61 1/2 |
| Kinnel at Boness | 61/ | 58/ |

Messrs. W. Colvin & Co. (Glasgow, April 25th) say: "The warrant market was very quiet all last week, the price remaining between 58 4/5 and 58 1/2, and closing on Friday at 58 3/4. Yesterday there was no change in the quota-

tions, but to-day business was more freely done from 58 3/4 to 58 1/2, closing with buyers at the lower price, and sellers asking 58 1/2. The demand for shipping iron continues languid, and prices are all bid. to 1/ per ton lower than last week, as under:

| | Deliverable alongside. | No. 1. | No. 2. |
|------------------------------------|------------------------|-----------------|-----------------|
| G. M. B. at Glasgow | 59 1/2 | 58 1/2 | 58 1/2 |
| Gartshill, | 60 1/2 | 59 1/2 | 59 1/2 |
| Coltness, | 68 6 | 60 1/2 | 59 1/2 |
| Summerlee, | 66/ | 59 1/2 | 59 1/2 |
| Langloan, | 67/ | 59 1/2 | 59 1/2 |
| Carphoe, | 68 6 | 59 1/2 | 59 1/2 |
| Monkland | 59/6 | 58 1/2 | 58 1/2 |
| Clyde | 58 6 | 58 1/2 | 58 1/2 |
| Monkland, at Broxburn | 58 6 | 58 1/2 | 58 1/2 |
| Calder, at Port Dundas | 68/ | 59 1/2 | 59 1/2 |
| Glenarnock, at Ardrossan | 65 6 | 59 1/2 | 59 1/2 |
| Eglington, | 58/ | 57 1/2 | 57 1/2 |
| Dalmellington, | 58/ | 57 1/2 | 57 1/2 |
| Caron, at Grangemouth | 62/6 | 58 1/2 | 58 1/2 |
| Charcoal, I. C. specially selected | 68/ | 60 1/2 | 59 1/2 |
| Shotts, at Leith | 60 1/2 | 59 1/2 | 59 1/2 |
| Kinnel, at Boness | 68/ | 59 1/2 | 59 1/2 |
| Bar Iron | £8 0/ to £8 10/ | £8 0/ to £8 10/ | £8 0/ to £8 10/ |
| Nail Rods | £9 0/ | £9 0/ | £9 0/ |

SHIPLANDS.

| | Tons. |
|-----------------------------|--------|
| Week ending April 24, 1875. | 13,591 |
| Decrease April 22, 1876. | 3,804 |
| Total decrease for 1875. | 37,918 |

"IS THE CAUCASIAN PLAYED OUT?"

Who can say? Yet it does not look promising to find that the heathen—not Chinese, but Japanese—are actually sending us cargoes of building materials. Some time ago the Japanese government sent over a few young men to be educated in the manners and customs of the English. One of these young men found that the London builders were crying out for bricks and could not obtain them. He had heard that bricks were being exported from his native land to America, but had also heard that the import duties prevented the trade from being carried on largely. He noted these facts down, and wrote off "home" advising the "old folks" to send their cargoes to England, where there would be no duty at all to pay. Accordingly, in one course (last week) a cargo arrived in London, and not only was it bought up, but large orders were at once given for future supplies. The Japanese bricks are said to be hard and of good quality. It is, nevertheless, somewhat strange that the domiciles of London and the far West should be constructed of bricks made in the far East, and that these latter can be shipped so great a distance and sold here at lower prices than our own productions.

TRADE OF SHEFFIELD.

No change has taken place locally during the past week, many of the works having been closed all the week, owing to the Easter holidays. There are now over 30,000 colliers out on strike in the district, and many of the iron workers are under notice. At John Brown & Co.'s and Charles Cannell & Co.'s, Sheffield, the bulk of the men are also out on strike against a reduction of wages of 10 to 15 per cent. The fact is, neither the iron nor coal masters care how long the men remain out, as there would be no duty at all to pay. According to this course (last week) a cargo arrived in London, and not only was it bought up, but large orders were at once given for future supplies. The Japanese bricks are said to be hard and of good quality. It is, nevertheless, somewhat strange that the domiciles of London and the far West should be constructed of bricks made in the far East, and that these latter can be shipped so great a distance and sold here at lower prices than our own productions.

TRAFFICKING IN EXPLOSIVES.

Ever since the Bremerhaven affair the ship owners, both of this and other countries, have become suspiciously watchful over all sorts of packages, and have exercised all their ingenuity to prevent another villain from sending ships to the bottom by this means for the sake of gain.

It is, in all senses, well that this should be so, inasmuch as the vessels might be lost by the inadvertence or carelessness of passengers, as well as by the plans of scheming over-insurers.

One of the former class, by name Henry William Johnson, described as a merchant, was brought up at the Bow Street Police Court, London, last week, charged with an offence of this nature, to wit, the sending of certain dangerous materials on board the P. & O. vessel *Bokhara*, without distinctly intimating the nature of such materials. Johnson, it appears, had taken his passage from Venice to Bombay, but the company had refused to carry packages of photographic materials for him. He nevertheless sent some packages, which by chance became opened *en route*, and were found to contain highly inflammable chemicals, such as collodium, ether, &c. The magistrates took a grave view of the case, and inflicted a fine of £80, in addition to ordering Johnson to find two securities for £50 each, and to enter into his own bond for £100 to appear when called upon.

G. B. THORNEYCROFT & CO.

This well known and very old established firm has just been brought out as a "Limited" company, the partnership previously existing having been dissolved by effusion of time, the senior partners being also retiring from business. The works comprise two blast furnaces, two finished iron works, iron mines and collieries, and the capital is fixed at the nominal sum of £200,000.

THE STAFFORDSHIRE IRON TRADE.

Like Mahomet's coffin, is in a state of suspension—if not, indeed, stagnation—consequent upon long continued suspension. There is next to no business doing, albeit some of the producers manifest a decided willingness to shade their quotations for all descriptions of finished iron. The arbitrator in the dispute between the iron masters and iron workers of South Staffordshire has awarded a reduction of 7 1/2 per cent.

The collieries of the same district have also received notices of a reduction of 6d. per day for

"thick coal" men, and 3d. per day for those employed on thin seams.

Some apprehension has arisen in this, as in other districts, owing to the want of protective duties now being

raised by Germany and Austria, in consequence

of which certain returns are now being made

to the Foreign Office by the iron manufacturers of the country.

THE METAL MARKETS

continue very quiet, there being no reportable movement save a slight improvement in copper.

Copper.—At the beginning of the week it

transpired that smelters had taken three car-

goes of Chile regulus at 16 1/2; also that about

2000 tons bars had changed hands in Liverpool from 278 to 278 10/.

This gave increased firmness to the market.

G. o. b. for immediate delivery, have been sold to a small extent, at £75,

whilst for forward delivery at fixed dates, and

to arrive, they have been done at 278 10/.

and they are still obtainable at that price.

Australian is dearer, and more inquired for.

Burns sold at £83 10/ to £84, and Wallaroo at £84 to £84 10/.

Ingot, £85 5/.

English has been rather irregular.

Most smelters adhere to the late advance-

ment; others, however, have been selling

cheaper, particularly manufactured, which was

sold at £90, now £91 to £92, the price.

We quote tough £85 and select £86. Tin has been

dull and declining; sales of Straits made from

£72 to £71, at which there are still sellers.

Australian is for the moment held off the market,

consequently the small sales reported have

been at comparatively firm prices, £71, 10/-;

the price is now nominally £73. In Holland, Banca nominal, 48 1/2 fl.; Billiton, 44 1/2 fl. English

quoted £77 for common ingots; £78, bars. Lead dull, at late rates; English, £21 10/- to £21 15/-; Spanish, £21 to £21 5/-. Spelter without transactions; Silesian is quoted nominally £24. Quicksilver, £10. Antimony scarce, £265."

Latest Liverpool prices are:

Iron: f. o. b. in Liverpool, per ton.

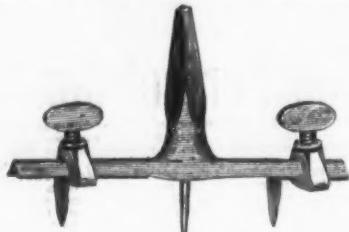
| | £ s. d. | £ s. d. | £ s. d. |
|------------------------|---------|---------|---------|
| Merchant bar, in Wales | 6 10 0 | 6 10 0 | 6 15 0 |
| Staffordshire | 7 15 0 | 7 15 0 | 7 15 0 |
| Sheets | 10 15 0 | 10 15 0 | 10 15 0 |
| Bar rods | 8 0 0 | 8 0 0 | 9 0 0 |
| Bar, best crown | 7 15 0 | 7 15 0 | 8 15 0 |
| Boiler plates | 10 0 0 | 10 0 0 | 12 0 0 |

Tin Plates: f. o. b. in Liverpool, per box.

| | £ s. d. | £ s. d. | £ s. d. |
| --- | --- | --- | --- |
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Improved Washer Cutter.

The above cut represents an improved Washer Cutter for cutting washers or circles from leather, rubber, paper or other material, for use on wagon axles, joints, steam and water pipes and various other purposes. It consists of a T shaped holder, the upper end of which may be held in an ordinary bit stock. The lower side has a triangular groove in it and a steel point in the center, on which it revolves. The cutters are made of triangular steel, and fit in



the groove in the holder, being held in place by an iron strap and set screw. The cutters are held with great firmness, and with very slight strain on the screws, owing to the shape and length of bearing which they have in the groove. This tool was patented in February, 1875, and is being manufactured and sold by Goodnow & Wrightman, Boston, Mass. See advertisement on page 36.

Old Business Houses in Europe.

In England and on the Continent of Europe there are mercantile and banking houses in active operation to-day which celebrated their centennial festivals long before the foundations of the American Union were laid. Only the other day, and as a consequence of the frantic and dishonest speculations engendered in Germany by the sudden flow into that country of the French milliards, a banking house suspended payments in Lubeck which had done business in that picturesque old Hanse town for more than 300 years under the same firm name. This is believed to have been the very oldest business house in Europe. But there are firms in Amsterdam and in Bordeaux of an antiquity hardly less imposing.

The publishing house of Firmin-Didot, in Paris, as all the world knows, has been notable among men from the early years of the eighteenth century; and there are hotels in France, as well as in Germany, which have been kept up and have prospered under one ensign from the time of the Thirty Years' war. Over the door-way, indeed, of one such inn—the Maison Rouge—at Reims, an inscription reads that within its walls the father and mother of the Maid of Orleans found shelter and good fare, with the heroic Maid herself, during the triumphant coronation of Charles V. of France. The most striking instance of commercial longevity in England, perhaps, is that of the famous banking house of Childs, at Temple Bar Within, the books and papers of which filled up for many years the muniment rooms of Temple Bar itself.

Among these records are to be found such papers as the accounts of Alderman Blackwell, then a member of the firm, for the sale of Dunkirk to the French for 6,000,000 of livres, by that "merry monarch," Charles II, in 1662, only four years after it had been hardly won from the Spaniards by the "Iron-sides" and iron will of Cromwell. "Francis Child at the Marygold in Fleet street, goldsmith," kept a "running cash" throughout the reign of Charles II, and founded the house. The Marygold is still its sign, and though the chief proprietor now wears the coronet of a British earl, the old firm name and symbol are still its proudest distinctions. In most of these cases, it is true, the perpetuity of a business enterprise has been linked with that of a particular family; but this is by no means an essential conjunction.

Special Notices.**Wanted.—A Partner**

In a well established business (8 years) in a western city. "Jobbing and Retail" in Machinery, Railroad, Mill, Steam and Gas Fitters' Supplies, Steam Heating one of the leading branches, and paying; amount of business annually over \$100,000.

Want to extend business and increase the present capital \$30,000. None but first-class business men with experience, energy and capital need apply. Give references. Address **MACHINERY,** Office of *The Iron Age*, 10 Warren St., N. Y.

VENTILATING & STEAM HEATING.

A thoroughly competent engineer, with extensive experience in the above line, desires employment.

Address **M.**
Office of *The Iron Age*, 10 Warren St., N. Y.

Wanted,

A Foreman who has had practical experience in the construction of Architectural Iron Work; must understand draughting and figuring quantities. A permanent situation for a good steady man.

Address **H. W. BELDIN,**
195 Beed St., Milwaukee, Wis., giving terms and references.

Wanted.

The co-operation of a party having an Iron Rail Mill, to organize the manufacture of Hydraulic Tubing and Hollow Shafting by a method not heretofore in use, which will materially reduce the cost of production and furnish a better article than has ever been made. Address **TUBE,**
Office of *The Iron Age*, 10 Warren St., N. Y.

Wanted.

A young man with business experience and good qualifications desires an opportunity as a clerk or assistant in some business, with a view to purchasing an interest in six or twelve months if everything is satisfactory. Would prefer a small manufacturing business or manufacturers' agency, in which a small capital could be invested with advantage. New York or vicinity preferred. Address **G. E.**
Office of *The Iron Age*, No. 10 Warren St., N. Y.

Special Notices.**Bargains in Machinery.**

We offer the following for sale, the new machines being marked N., all others being second-hand.

MACHINE TOOLS.

Planer, 16 ft. x 42 in. sq., \$1525; 16 ft. x 31 in., \$900; 11 ft. x 30 in., \$590; 8 ft. x 26 in., N., \$700;

ft. x 15 in., \$240; 8 ft. x 14 in. x 16 in., \$300; 4 ft. x 16 in., \$190; Putnam 24 in. Gear Cutter, \$500; Combined Gear Cutter and Miller, 24 in., \$450; Milling Machine, N., \$387; 52 in. Warner & Whitney Vertical Drill, \$250; Upright Splicer, \$80; Heavy double Press, \$200; Taft Press, \$145; 8 ft. x 44 in. Chucking Lathe, with Slide Rest, \$225; No. 2 Merriman Bolt Cutter and Nut Tapper, capacity 1½ in., \$175; Round Portable Forge, \$20; Back-geared, Screw-cutting Engine Lathes, complete, 60 in. swing, turning 7 ft. between centers, N., \$200; 25 ft. x 36 in. N., \$1550; 20 ft. x 24 in. N., \$900; 16 ft. x 21 in., \$650; 16 ft. x 31 in. (with chuck), \$600; 12½ ft. x 30 in., \$50; 15 ft. x 30 in., \$400; 12 ft. x 24 in., \$425; 8 ft. x 20 in., \$240; 6 ft. x 15 in., \$230; 6 ft. x 17 in., \$225; 6 ft. x 18 in., \$217; 6 ft. x 15 in., \$165; 6 ft. x 16 in., \$175; 5 ft. x 14 in., \$195; 5 ft. x 15 in., \$210; Not screw-cutting, 16 ft. x 24 in., \$240; 15 ft. x 20 in., \$350; 16 ft. x 30 in., double headed, \$250; 11 ft. x 12 in., double headed, \$155; 8 ft. x 17 in., \$215; 5 ft. x 18 in., \$95; 4 ft. x 19 in., \$150; Speed or Drill Lathes, 5—6 ft. x 12 in., N., \$75 each; 6 ft. x 13 in., \$50; 5 ft. x 18 in., \$75; 3 ft. x 10 in., \$35; 2 ft. x 9 in., \$25; One Japanning Oven, \$220; 27 x 20; 15 in., 3 jawed Westcott, N., chuck, \$50; 12 in., 3 jawed Westcott, N., chuck, \$42; 12 in.,

PORTABLE AND STATIONARY ENGINES AND BOILERS.

8 h. p. stationary, horizontal Engine, cylinder 14 x 45, \$1600; 75 h. p. hor. Engine, 16 x 60, \$800; 60 h. p. sta. hor. Engine, 14 x 30, \$1000; 80 h. p. hor. Boiler, \$1000; 60 h. p. Box Boiler, \$500; 2—60 h. p. Locomotive Fire Box Boilers, each \$400; Upright, 50 h. p. Club-buck Engine, 2—9 x 18 cylinders, \$1050; 45 h. p. hor. Boiler, \$700; 2—60 h. p. 2 flat Boilers, \$100; 45 h. p. hor. Boiler, \$700; 12—60 h. p. Portable Engines, 12 x 18, \$1270; 12—60 h. p. Portable Engines, 12 x 24, \$1200; 12—60 h. p. upright Engines, 12 x 24, \$1200; 12—60 h. p. Box Boilers, \$450; 4—50 h. p. Locomotive Fire Box Boilers, each \$400; Upright, 50 h. p. Club-buck Engine, 2—9 x 18 cylinders, \$1050; 35 h. p. hor. Boiler, \$700; 2—60 h. p. Portable Engines, 12 x 18, \$1270; 12—60 h. p. Portable Engines, 12 x 24, \$1200; 12—60 h. p. Box Boilers, \$450; 4—50 h. p. Upright Boiler, \$850; 2—25 h. p. Portable Engines, \$950 and \$820; 25 h. p. sta. hor. Engine, \$825; 50 h. p. sta. hor. Engine, 12 x 24, \$825; 30 h. p. hor. Portable Engine, 12 x 18, \$825; 30 h. p. sta. hor. Engine, 12 x 24, \$825; 50 h. p. sta. hor. Boiler, \$1100; 2—30 h. p. upright Boilers, \$925 and \$925; 2—18 h. p. Portable Engines, \$925 and \$900; 15 h. p. sta. hor. Engine, 9 x 11, \$350; 16 h. p. hor. Portable Boiler, 12 h. p. upright Engine, 16 h. p. Boiler, \$550; 12—60 h. p. sta. hor. Engine, 7 x 14, \$1200; 12 h. p. Portable Engine, \$440; 10 h. p. upright Boiler, \$176; 8 h. p. Portable Engine, trucks and all attachments for threshing, \$550; 8 h. p. sta. hor. Engine and upright Boiler, \$480; 7 h. p. Hot Air or Caloric Engine, \$640; 7 h. p. Portable Engine, with hoisting attachment, \$450; 6 h. p. Portable Engine, \$400; 6 h. p. hor. Engine, 5½ x 10, \$160; 5 h. p. upright Engine and Boiler, with lot shunting, etc., \$430; 5 h. p. Portable Engine and wood-sawing apparatus, \$305; 5 h. p. Root Sectional Safety Boiler, \$75; 3 h. p. Roper or Hot Air Engine, \$225; 1½ h. p. Portable Engine, N., \$185; 2½ h. p. sta. hor. Engine and Boiler, \$300; 2½ h. p. sta. hor. Boiler, \$70; 18 in. Steam Whistle, N., \$.75 (can be heard 30 miles); 12 in. Steam Whistle, \$30; 8 in. Steam Whistle, \$20.

PORTABLE ENGINES AND CIRCULAR SAW MILLS.

35 h. p. Portable Engine, 48 ft. Circular Saw Mill, Set works, 14 ft. long, 12 ft. wide, two large saws, smaller saws, hangers, etc., \$2150; 18 h. p. Portable Engine, 37 ft. Circular Saw Mill, Set Works, large saws, small saws and arbors, all belting, etc., \$1675.

CIRCULAR SAWS.

60 in. 6 and 9 gauge, Dixson Saw, \$110; 49 in. Hoe Inserted Tooth Saw, \$70; 48 in. Emerson Inserted Tooth Saw, \$50; 2—46 in. 6 and 7 gauge Saws, each \$35; 1—44 in. Saw, \$25; 1—52 in. 6 and 7 gauge Saw, \$40.

SAW MILL AND WOOD-WORKING MACHINERY.

30 ft. Circular Saw Mill, set works, saw, belting, etc., \$375; 28 ft. Circular Saw Mill, set works, saw, belting, etc., \$350; 2 Patent Set Saw, N., each \$80; Universal Saw Mill, 28 ft. x 20 ft., each \$120; 20 ft. x 20 ft., \$112; 2 ft. in. Logging Chain, 50 lb.; 2 ft. Car Wheels, \$17; 2 Screw Head Blocks, \$16; each Brown Frost Log Dog, \$22; 4 Shingle Mills and Jointers, \$300; 115, \$90; 260; 265; Gang Lathe Sawing Machine, \$185; 4 Bobbin Lathe, \$60; each Baldwin Wood Lathe, hollow auger style, \$175; 30 in. Rotary Bed Planer, \$20; 26 in. Rotary Bed Planer, \$240; 24 in. Rotary Bed Planer, \$26; 26 in. Bedding, \$100; 26 in. N., \$265; No. 3, Woodworth Planer and Matcher, Ball's, N., \$1000; No. 0 Woodworth Planer and Matcher, Ball's, N., \$760; Woodworth Planer and Matcher, No. 23, Ball's, \$75; 24 in. Woodworth Planer, Ball's, N., \$245; 24 in. Exsicator Planer and Matcher, Ball's, N., \$410; 4 Roll Planer, \$260; Cylinder Planer, \$140; 16 in. Woodworth Planer, \$90; 24 in. Woodworth Planer, \$90; 26 in. Woodworth Planer, \$90; 28 in. Woodworth Planer, \$90; 30 in. Woodworth Planer, \$90; 32 in. Woodworth Planer, \$90; 34 in. Woodworth Planer, \$90; 36 in. Woodworth Planer, \$90; 38 in. Woodworth Planer, \$90; 40 in. Woodworth Planer, \$90; 42 in. Woodworth Planer, \$90; 44 in. Woodworth Planer, \$90; 46 in. Woodworth Planer, \$90; 48 in. Woodworth Planer, \$90; 50 in. Woodworth Planer, \$90; 52 in. Woodworth Planer, \$90; 54 in. Woodworth Planer, \$90; 56 in. Woodworth Planer, \$90; 58 in. Woodworth Planer, \$90; 60 in. Woodworth Planer, \$90; 62 in. Woodworth Planer, \$90; 64 in. Woodworth Planer, \$90; 66 in. Woodworth Planer, \$90; 68 in. Woodworth Planer, \$90; 70 in. Woodworth Planer, \$90; 72 in. Woodworth Planer, \$90; 74 in. Woodworth Planer, \$90; 76 in. Woodworth Planer, \$90; 78 in. Woodworth Planer, \$90; 80 in. Woodworth Planer, \$90; 82 in. Woodworth Planer, \$90; 84 in. Woodworth Planer, \$90; 86 in. 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Woodworth Planer, \$90; 398 in. Woodworth Planer, \$90; 400 in.

Forehand & Wadsworth's Double-Action

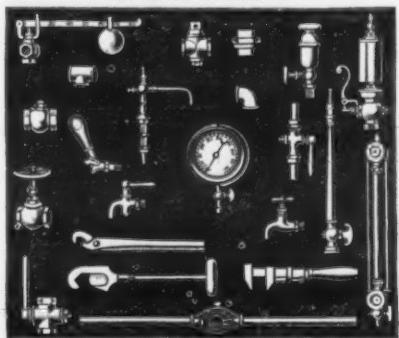
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Manufacturers of Standard and O. K. Revolvers, Charles Daly Guns. Agents for Wesson & Harrington, J. P. Clabrough & Bro., Importers of Guns, Gun Material, &c. Illustrated Catalogue furnished to only those whom we know to be in the trade.

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The Atlantic White Lead and Linseed Oil Company,

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INDESTRUCTIBLE ENAMELED PIPE**
For Water, Gas, Sewage & Soil Pipe.

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NATIONAL TUBE WORKS CO.,

Also Lap Welded Steam & Gas Pipe & Boiler Tubes.

Tubing & Casing for Artesian, Oil & Salt Wells (with Patent Protecting Coupling).

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McNab & Harlin Mfg. Co.,

MANUFACTURERS OF

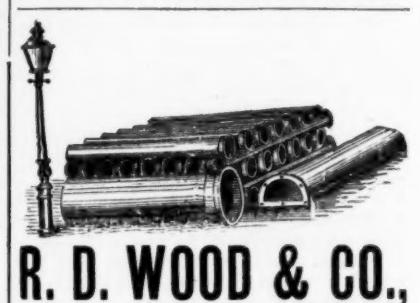
BRASS COCKS**For STEAM, WATER and GAS.**Wrought Iron Pipe & Fittings, Plain and Galvanized
PLUMBERS' MATERIALS.

Illustrated Catalogue sent by express to the Trade on application.

Factory, Paterson, N. J.

56 John Street, N. Y.

We call your attention especially to our new patent wire frame comb. The result of a long series of experiments, made with a view to meeting all the requirements of a *Perfect Comb*. It is better, stronger, and more durable than any ever before invented. The raised wire shank gives when pressure is applied, a position, viz.: a rest and brace for the thumb, in such a position that the hand cannot come in contact with the horse hair or wire frame. The wire braces which run from the shank over the back of the frame, give both strength and durability in a direction never heretofore attained, and at the same time serve as an extra handle; and when held by the fingers in connection with the raised shank the comb is more easily managed, especially by old, and with much less fatigue to the hand than is possible in any other formation—in short, it needs but a trial to vindicate its name: *The Perfect Comb*.

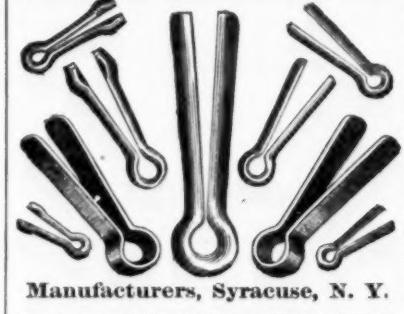
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Sole Manufacturers of
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Water Closets,
PUMPS, CABINET WOOD WORK, &c.
106, 108 & 110 Centre Street,
Factory, Mott Haven, NEW YORK.**J. AUSTIN & CO.,**168 Fulton Street, N. Y.,
Proprietors and Manufacturers of**WHEATCROFT'S SELF-ADJUSTING****Pipe Wrench,**
AND
Scripture's Funnel Top
MACHINE OILERS.
Dealers in
STEAM AND GAS FITTERS TOOLS.

The Acme Pipe Cutter.
MADE ENTIRELY OF SOLID CAST STEEL.
Cuts Wrought Iron, Brass and Copper Pipes
Round Iron & perfectly true without leaving
burr on pipe, contracting or splitting it. Cuts
out a chip similar to a file tool. The knife
may be removed and ground. Send for descriptive
circular to manufacturers.

Pancoat & Maule
PHILADELPHIA, PA.**WM. ESTERBROOK**
Wholesale Manufacturer of
Coal Hods, FIRE SHOVELS, Etc.
311 Cherry St., PHILADELPHIA.**CAST IRON PIPES**

FOR WATER AND GAS.

Branches Retorts, &c.

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PHILLIPSBURG NEW JERSEY.**GEORGE BARNES & CO.,****TRANSFER ORNAMENTS**For Tin, Japan Ware, Safe and Carriage Manufacturers, &c. For sale by
JULIUS FECHTELER, 104 John St., N. Y.
I sell my Carriage Ornaments to dealers only.**W.M. LAW, REFRIGERATOR**
Manufacturer, 78 John Street, NEW YORK.**EDWARD BARR,**
78 John Street, NEW YORK.Tubes for Gas, Steam & Water
1-16 to 48 inch. Gas, Steam Fitters', Plumbers' and
Machine Tools' Supplies. Boiler Tubes, Iron and
Steel Articles, Rivets, Tools, Etc. Railroad Cars
and Cars. Bridges and Buildings.

Agent for W. C. ALLISON & SONS.

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Warehouses, 50 & 52 S. 4th St., above Chestnut, Phila.
New York Store, 49 Liberty Street.
Pittsburgh Store, 49 Smithfield Street.**SCALES SCALE AND TESTING WORKS**
PHILA. ESTABLISHED 1844'Patented' Furnace Charging Scale,
Double Beam R. R. Track Scale, Compound Parallel Crane Beams, &c. Patented First Power Lever Wagon Scales. Testing Machines any capacity.
Send for Illustrated Price List.**Patent Automatic Dog Muzzles.**

The most humane invention ever made.

Also, full line Dog Collars and Bridle Fronts.

STAIR RODS, in Brass, Fire Gilt, Silver & Nickel Plated.

A full assortment Unholsterers' Hardware, Thread, Bindings, Tacks, &c.

BRASS GOODS OF ALL KINDS MADE TO ORDER.

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| Alarm Whistles and Speaking Tubes. | 2 |
| Fredericks C. A., 88 Fulton, N. Y. | 2 |
| Ostrander W. H., 19 Ann, N. Y. | 2 |
| Agricultural Steels and Irons, etc., Makers of. | 13 |
| Forquer A. B., York, Pa. | 13 |
| Kellogg & Co., Pittsburgh, Pa. | 13 |
| Almond Tins. | 10 |
| Tucker & Dorsay, Indianapolis, Ind. | 10 |
| Animal Pokes. | 12 |
| Bishop & Benedict, Berea, O. | 12 |
| Anvils, Manufacturers of. | 12 |
| Fisher & Norris, Trenton, N. J. | 12 |
| Angora Bits, etc., Manufacturers of. | 19 |
| Clark Wm. A., Westville, Conn. | 19 |
| The Union Axle & Co., Canterbury, Conn. | 19 |
| The Douglass Mfg. Co., 62 Read, N. Y. | 9 |
| Axes, Edge Tools, &c., Manufacturers of. | 10 |
| Francis Axe Co., Buffalo, N. Y. | 10 |
| Jones H. H. & Co., Cohoes, N. Y. | 10 |
| Mack & Co., Rochester, N. Y. | 10 |
| Axle & Spur Axles, Manufacturers of. | 10 |
| Brown & Arthur & Co., Fisherlawn, Concord, N. H. | 14 |
| Cook R. & Sons, Windham, Ct. | 12 |
| Springer Perf Co., Bridgeport, Conn. | 12 |
| Todd & Son, 100 Broad St., New Haven, Conn. | 12 |
| Hutchins G. H., Fred & Co., Brooklyn, E. D. | 43 |
| Wentworth H. M. & Co., Gardner, Me. | 12 |
| Axle Greas., Makers of. | 17 |
| Frazer Lubricator Co., 104 Maiden Lane, N. Y. | 17 |
| Band Saws and Tools for Brazing & Co., Importers of. | 2 |
| George & Son, 29 4th, N. Y. | 10 |
| Bed Springs, Makers of. | 42 |
| Shelton Co., Birmingham, Conn. | 42 |
| Bellows, Manufacturers of. | 45 |
| Churchyard, Joseph, Buffalo, N. Y. | 45 |
| Newcombs Bro's., 586 Water, N. Y. | 45 |
| Scott Geo. M., Chicago, Ill. | 45 |
| Belt & Chain Works, 53 and 55 Hollis-Holme St., Baltimore Md. | 12 |
| Williams E. A. & Son, 107 Plymouth, Jersey City, N. J. | 2 |
| Belt Hinges. | 2 |
| The Holbrook Patent Blind Hinge Mfg. Co., Water-town, N. Y. | 6 |
| Betting, Leather, Makers of. | 10 |
| Allen & Williams, 100 Franklin, N. Y. | 10 |
| Army Charles W., 148 N. 3d, Phila. | 43 |
| Foreman Wm. F., Jr. & Bros., Phila. | 43 |
| Bird Luges, Makers of. | 45 |
| Linnecar, Joseph, 100 Franklin, N. Y. | 45 |
| Blackmer Adam, 209 Pearl, N. Y. | 18 |
| Osborn Mfg. Co., 70 Beecker, N. Y. | 18 |
| Bit Braces, Manufacturers of. | 37 |
| Milner & Mfg. Co., 14 Chambers, N. Y. | 37 |
| Bit Setting. | 2 |
| Rodcliffe S., 306 West, N. Y. | 2 |
| Borax. | 2 |
| Pizer Chas. & Co., New York. | 2 |
| Brown, George, Makers of. | 11 |
| Tiebold W. J., 230 Pearl, N. Y. | 11 |
| Bronze, Manufacturers of. | 2 |
| Alison Brand & Co., 19 Cliff, N. Y. | 2 |
| Brass Works, 53 and 55 Hollis-Holme St., Baltimore, Md. | 12 |
| Brass, Baltimore, Md. | 12 |
| Brown, John, 209 Pearl, N. Y. | 18 |
| Buckner, John, Shefford, England. | 1 |
| Bucks and Hinges, Makers of. | 41 |
| American Butt Co., Providence, R. I. | 42 |
| American Steel & Wire Co., Beckman, N. Y. | 42 |
| Hough Bros., 194 Broadway, N. Y. | 48 |
| Union Mtg. Co., 96 Chambers, N. Y. | 48 |
| Western Butt Co., St. Louis, Mo. | 7 |
| Bridges, Builders. | 12 |
| Moskovitz Iron Bridges and Roof Co., 5 Day, N. Y. | 5 |
| Leighton Bridge and Iron Works, Rochester, N. Y. | 18 |
| Buckle & Pin, Manufacturers of. | 18 |
| Winton John, 100 Franklin, N. Y. | 20 |
| Waterbury Brass Co., 52 Beecker, N. Y. | 20 |
| Brick Presses, Makers of. | 10 |
| Carmell F. L. & R., 1844 Germantown Ave., Phila. | 36 |
| Schultz & Co., Perth Amboy, N. J. | 36 |
| Bridges, Iron. | 12 |
| Hubbard, Phila. | 12 |
| Monksley Iron Bridges and Roof Co., 5 Day, N. Y. | 5 |
| Leighton Bridge and Iron Works, Rochester, N. Y. | 18 |
| Buckle & Pin, Manufacturers of. | 18 |
| Winton John, 100 Franklin, N. Y. | 20 |
| Buckles, Makers of. | 10 |
| Curry Comb Mfg. Co., Columbus, O. | 10 |
| Fauer Brothers, 59 Chambers, N. Y. | 44 |
| Lawrence & Son, 22 Avenue, N. Y. | 44 |
| Coat, Miners of. | 41 |
| Lehigh Valley Coal Co., cor Courland and Church, N. Y. | 13 |
| Parke A. & Co., 111 Broadway, N. Y. | 13 |
| Can Vases. | 13 |
| Slater Shepard & Co., Buffalo, N. Y. | 39 |
| Easterbrook Wm. M., Sherb, Phila. | 34 |
| Coffee and Spice Mills. | 3 |
| Lane Brothers, Milbury, N. Y. | 6 |
| Enterprise Co., 100 Franklin, N. Y. | 6 |
| Enterprize Cutters and Dividers, Manufacturers of. | 6 |
| Bennet & Call Hardw. & Tool Co., Springfield, Mass. | 12 |
| Copper's Tools, etc., Dealers in. | 12 |
| Leach & Tipton, 100 Franklin, N. Y. | 10 and 36 |
| Covered & iron. | 12 |
| Moseley Iron Bridge and Roof Co., 5 Day, N. Y. | 5 |
| Cotton Gin Feeders, Manufacturers of. | 10 |
| The own Compt. Co., New London, Conn. | 46 |
| Creibell, Manufacturers of. | 10 |
| Strow, Wile & Co., 50 Marke, Phila. | 43 |
| Carry Comb, Manufacturers of. | 43 |
| Turner Wm. W., High Bridge, N. J. | 6 |
| Casters, Furniture. | 1 |
| Toler John, Sons & Co., Newark, N. J. | 48 |
| Chemical and Physical Instruments. | 10 |
| Heath & Co., Greenwich, N. Y. | 33 |
| Chisels, Manufacturers of. | 33 |
| Buck Bros., Milbury, Mass. | 3 |
| Mack & Co., Rochester, N. Y. | 44 |
| Chimney Pots. | 1 |
| Phoenix Brass and Iron Foundry, Allentown, Pa. | 41 |
| Coal, Miners of. | 41 |
| Lehigh Valley Coal Co., cor Courland and Church, N. Y. | 13 |
| Parke A. & Co., 111 Broadway, N. Y. | 13 |
| Canal Vases. | 13 |
| Slater Shepard & Co., Buffalo, N. Y. | 39 |
| Easterbrook Wm. M., Sherb, Phila. | 34 |
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| Buck Bros., Milbury, Mass. | 3 |
| Mack & Co., Rochester, N. Y. | 44 |
| Chimney Pots. | 1 |
| Phoenix Brass and Iron Foundry, Allentown, Pa. | 41 |
| Coal, Miners of. | 41 |
| Lehigh Valley Coal Co., Hartford, Conn. | 18 |
| Hovey & Parker, 121 South 4th, Phila. | 42 |
| Dredging, and Makers of Dredging Machines. | 42 |
| Am. Dredging Co., 108, Delaware ave., Phila. | 47 |
| Drill Chuck, Manufacturers of. | 34 |
| Leach & Tipton, 100 Franklin, N. Y. | 10 and 36 |
| Dressing Machines, Makers of. | 35 |
| Thorne, Dehaven, & Co., Philadelphia. | 46 |
| Drop Forgings, Makers of. | 10 |
| Baker Hermann & Co., Hartford, Conn. | 10 |
| Hammonton & Co., 101 Duane, N. Y. | 10 |
| The Hull & Bell Co., Danbury, Conn. | 8 |
| Edwards, Tool Co., 100 Franklin, N. Y. | 8 |
| The Hull & Bell Co., Danbury, Conn. | 8 |
| Edwards, Tool Co., 100 Franklin, N. Y. | 8 |
| Baker Hermann & Co., 101 Duane, N. Y. | 41 |
| Clawther F. & W., 52 Chambers, N. Y. | 11 |
| Clayton & Son, 100 Franklin, N. Y. | 11 |
| Crane Bros. & Co., 14 Chambers, N. Y. | 11 |
| Hooley Machine Co., 219 Cherry, N. Y. | 36 |
| Whitney Machine Co., 178 Tremont, Boston, Mass. | 46 |
| Quackenbush, Townsend & Co., 59 Reade, N. Y. | 42 |
| Van Wagner & Williams, 52 Beckman, N. Y. | 42 |
| Door, Glass, Manufacturers of. | 10 |
| Turner Wm. W., High Bridge, N. J. | 11 |
| Dredging, and Makers of Dredging Machines. | 42 |
| Am. Dredging Co., 108, Delaware ave., Phila. | 47 |
| Drill Chuck, Manufacturers of. | 34 |
| Leach & Tipton, 100 Franklin, N. Y. | 10 and 36 |
| Dressing Machines, Makers of. | 35 |
| Thorne, Dehaven, & Co., Philadelphia. | 46 |
| Drop Forgings, Makers of. | 10 |
| Baker Hermann & Co., Hartford, Conn. | 10 |
| Hammonton & Co., 101 Duane, N. Y. | 10 |
| The Hull & Bell Co., Danbury, Conn. | 8 |
| Edwards, Tool Co., 100 Franklin, N. Y. | 8 |
| Baker Hermann & Co., 101 and 105 Duane, N. Y. | 41 |
| Clawther F. & W., 52 Chambers, N. Y. | 11 |
| Crane Bros. & Co., 14 Chambers, N. Y. | 11 |
| Hooley Machine Co., 219 Cherry, N. Y. | 36 |
| Whitney Machine Co., 178 Tremont, Boston, Mass. | 46 |
| Quackenbush, Townsend & Co., 59 Reade, N. Y. | 42 |
| Van Wagner & Williams, 52 Beckman, N. Y. | 42 |
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| Baker Hermann & Co., 101 and 105 Duane, N. Y. | 41 |
| Clawther F. & W., 52 Chambers, N. Y. | 11 |
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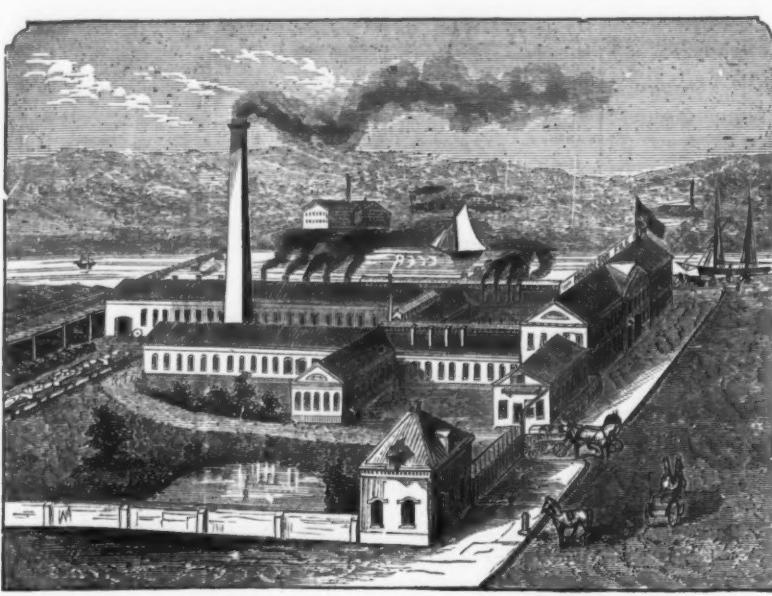
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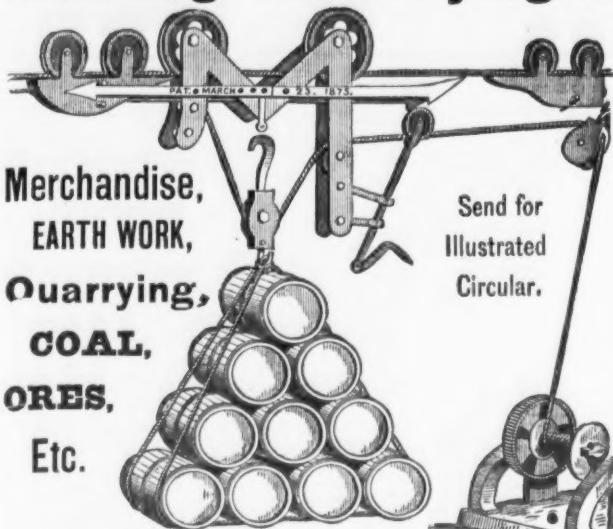
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PERMANENT ELASTICITY.

We make this style with single rod, double rod, and wood frames, and intend that it shall, in quality
compare favorably with our other well known brands.

BENJAMIN F. BADGER & SON, Manufacturer,
Badger Place, Charlestown, Mass.

The National Steel Tube Cleaner.



Patented July 28, 1874.

Guaranteed to clean better, last longer and work easier than any in the market. Removes all Carbon and Scale
from the Boiler Tubes. Adopted and in use by United States Navy. For sale by dealers.

THE CHALMERS SPENCE CO., Foot East 9th St., N. Y., Agents for the United States.

Keystone Pressure Blowers.

Anti-friction and noiseless; maximum blast and
minimum power; all sizes for
Forges, Foundries, Rolling Mills, &c.
ALSO

KEYSTONE EXHAUST BLOWERS

Made on same principle,
For Ventilating Mines, Buildings,
etc.; Removing Dust, Shavings,
etc.; Drying Wool,
Lumber, etc.

EVERY BLOWER GUARANTEED.

Send for circular, or call and see them in operation.

Keystone Portable Forge Co.,
120 Exchange Place, Philadelphia.

Also, sole manufacturers of the celebrated

KEYSTONE PORTABLE FORGES,

For all classes of work, from the lightest to the

heaviest.



NEW METHOD OF ENGRAVING
Moss' Process.
Photo Engraving Co.
67 Park Place, New York.

REMOVED May 1st, 1876, from 62 COURTLAND STREET to 67 PARK PLACE.

J. FRANCIS MURRAY, President.
JOHN C. MURRAY, Manager.
M. L. GARNETT, General Agent.

RELIEF PLATES

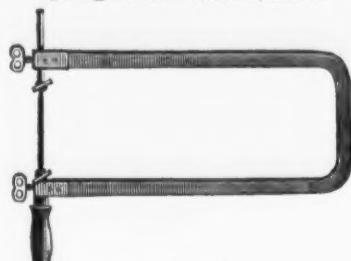
For Newspaper, Book, and Catalogue Illustrations, engraved in half-Tone, by a new Photographic and Chemical method, from all kinds of Prints, Pen-and-Ink Drawings, Original Drawings, Water-colors, &c., more cleanly than Wood-cuts. These Plates have a printing surface as smooth as glass, the lines are deeper than those of wood, and therefore we guarantee them to print perfectly clear and sharp, on wet or dry paper, and on any press where type or wood can be printed. Electrotypes or Stereotypes can be made from them in the usual way.

Our Plates are now used by the principal publishers and manufacturers in every state in the Union.

BEND STAMP FOR ILLUSTRATED CIRCULAR. Please say where you saw this.

MILLERS FALLS CO., 74 Chambers St., N. Y.

Spring Steel.—Rosewood Handle.



This frame will hold Saws from 2 to 5 inches in
length, and face them in any direction.

| | |
|--------------|--------|
| 8 inch, each | \$1.10 |
| 12 " " | 1.20 |
| 14 " " | 1.30 |
| 16 " " | 1.40 |

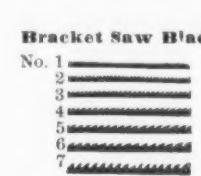
Soldering Casket.



Soldering Iron, Scraper, Bar of Solder and Box of
Rosin.

Put up in a nice box. Price, per dozen, \$6.00.

Bracket Saw Blades.



Price, per dozen, 25 cents.

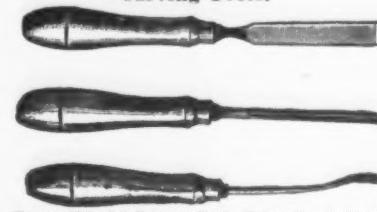
Patent Bracket Saw Frame.



Wood highly polished.

| | |
|-------------------------------|--------|
| 12 and 14 inch Rosewood, each | \$1.25 |
| 12 and 14 inch Birch, " " | 1.00 |

Carving Tools.



Gouge, Chisel & Parting Tool. Price, \$1.00.
These Tools are put up three in a box, with
Adhesive Wood handles, and nicely fitted for use. They
are equal to imported tools, and sell at a lower
price.

Large Discount to Dealers.

THE EAGLE ANVIL

!! WARRANTED !!



(ESTABLISHED) 1843.

These Anvils are superior to the best English, or other Anvils, on account of
the peculiar process of their manufacture (invented and used only by this concern),
and from the quality of the materials employed.

The best English Anvils become hollowing on the face by continued hammering
in use, on account of the fibrous nature of the wrought iron—causing it to "settle"

under the weight of the hammer.

The body of the Eagle Anvils is of crystallized iron, and no settling can ever
occur; the steel face, therefore, remains perfectly true. Also, it has the great ad-
vantage that being of a more solid material, and consequently with less rebound,
the piece forged receives the full effect of the hammer, instead of a part of it being
wasted by the rebound, as of a wrought iron anvil. An equal amount of work can,
therefore, be done with this anvil with a hammer one-fifth lighter than that required
when using a wrought iron anvil.

The working surface is in one piece of JESSEUP'S BEST TOOL CAST STEEL, which
being accurately ground, is hardened and given the proper temper for the heaviest
work. The horn is covered with and its extremity made entirely of steel.

The body of the Anvil is of the strongest grade of American iron, to which the cast
steel face is warranted to be thoroughly welded and not to come off.

NEW PRICE LIST. ANVILS of 100 lbs. to 800 lbs., 100. per lb.

Small Anvils, ("Minima")

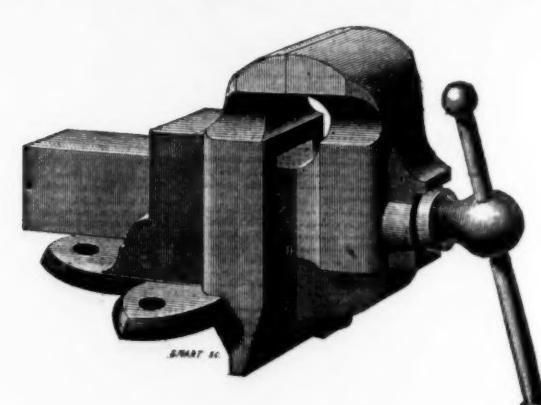
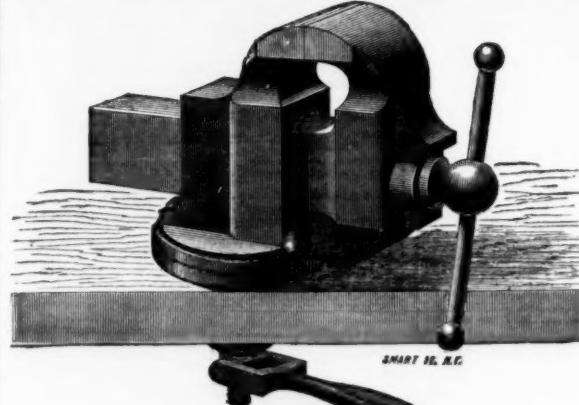
| | 10 lb. | 15 lb. | 20 lb. | 25 lb. | 30 lb. | 40 lb. | 50 lb. | 60 lb. | 70 lb. | 80 lb. | 90 lb. |
|----------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Weighing about | \$2.50 | \$3.20 | \$3.75 | \$4.50 | \$5.00 | \$5.50 | \$6.75 | \$7.25 | \$8.10 | \$9.00 | \$9.50 |

THESE GOODS ARE SOLD BY THE GENERAL AGENTS (with special discounts to the trade).

New York.—Messrs. J. CLARK WILSON & CO.—RUSSELL & ERWIN MFG. CO.—HORACE DURRIE & CO. Boston.—
Messrs. GEORGE H. GRAY & DANFORTH. Philadelphia.—Messrs. JAMES C. HAND & CO. Baltimore.—Mr. W. H. COLE.
Louisville.—Messrs. W. B. BELKNAP & CO. FISHER & NORRIS, Sole Manufacturers, Trenton, N. J.

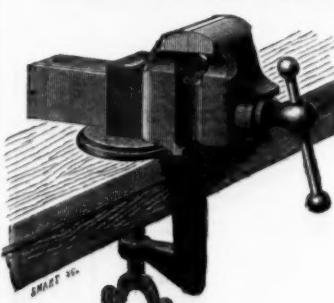
HOWARD PARALLEL BENCH VISE.
MANUFACTURED BY
Howard Iron Works,
Send for price list. **Buffalo, N.Y.**
RUSSELL & ERWIN MFG. CO. NEW YORK & PHILADELPHIA AGENTS.

Simpson's Adjustable Parallel Vises.



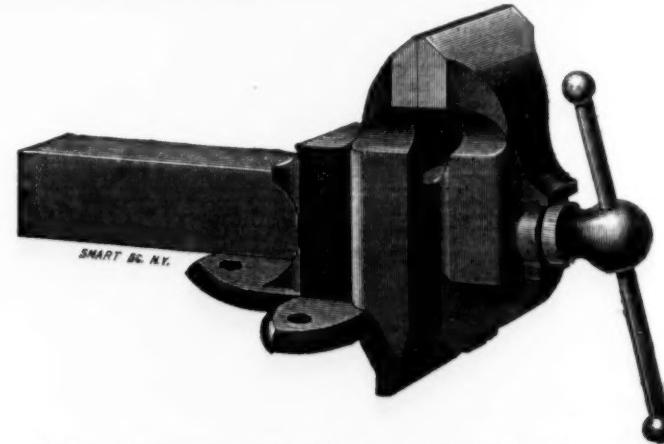
The Jaws can be instantly opened or closed the full length, by one movement of the hand, without the use of the screw.
They combine the QUICK ADJUSTMENT with all the advantages of the best Screw Vises, holding the work with as slight or firm a grip
as may be desired, without any liability to jar or work loose, as is the case with other adjustable vises.

The Screw being used merely to give the grip, they will outwear any Vises in market.



Their extreme simplicity constitutes one of their
strongest recommendations.

Send for Price List.



BAILEY WRINGING MACHINE CO., Sole Agents, 99 Chambers Street, N. Y.

New York Wholesale Prices, May 10, 1876.

HARDWARE.

| | | | | | | | |
|-----------------------------------------------|---------------------------------------|------------------------------------|--------------|----------------------------------|---------------------------|----------------------------------------------------------------|--------------------|
| America. | \$ 15c. dis 20% | Loose Joint, Narrow and Broad. | dis 50 & 10% | Dover. | \$ doz 20-40 | Plane Irons, Sand Tool Co., " Spur & Wagon W. | dis 10% |
| Wright's. | \$ 10 gold 10% over 250 lbs 10c. gold | Parliment, Butts & Mayer's Hinges. | dis 4 & 10% | Nathaniel. | \$ doz 20-40 | " Sandusky Tool Co. | dis 10% |
| Armada's Mouse Hole. | \$ 10 gold 10% over 250 lbs 10c. He | Loose Pin. | dis 45 & 10% | Screw Hook and Strap. | 14 to 36 in. 11 c. dis 40 | Plow Bits, Greenfield Tool Co. | dis 10% |
| W. Williams'. | \$ 10 gold 10% over 250 lbs 10c. He | Loose Pin Japanned. | dis 35 & 10% | Heavy Welded Hook. | 14 in. 9 1/2 c. dis 30 | Hull's Patent Nippers, No. 1, \$15; No. 2, \$21 per doz dis 25 | dis 85% |
| Eagle Anvils (American). | \$ 10c dis 20% | Fast Joint, Dated. | dis 25 & 10% | Washington Mills, Regular No. 1. | Flour, 100 lbs 10c dis 40 | Leach's Patent Wire Cutters. | per doz \$6 dis 15 |
| Apple Parers. | | Fast Joint, Narrow. | dis 35 & 10% | Washington Mills, Regular No. 2. | Flour, 100 lbs 8c dis 40 | Gas Pliers. | dis 15% |
| Domestic. | | Fast Joint, Broad, Japanned. | dis 35 & 10% | Wellington Mills, Grain. | Flour, 100 lbs 8c dis 40 | Plates and Nippers. | dis 25% |
| Turn Table. | | Loose Pin, Acorn. | dis 45 & 10% | | | Stanley R. & L. Co.'s Pat. Adjustable. | dis 60 & 10% |
| Lubricator. | | " Acorn. | dis 5 & 10% | | | Non-Adjustable. | dis 60 & 10% |
| Hudson's. | \$ 17.50 per doz | " Japanned. | dis 5 & 10% | Screw Hook and Eye. | 1/2 in. 9 1/2 c. dis 40 | Standard Rule Co.'s New Adjustable. | dis 60 & 10% |
| Reading. | | Plated Tips. | dis 50 & 10% | | | Standard Rule Co.'s Non-Adjustable. | dis 60 & 10% |
| Union. | | Fastened. | dis 25 & 10% | | | Pocket Levers. | dis 60 & 10% |
| Solid Carb. Cutting, Slitting. | \$ 10 per doz net | Fastened. | dis 35 & 10% | | | Leach's Patent Adjustable. | dis 60 & 10% |
| Bay State, Paring, Coring and Slitting. | \$ 15 50 per doz net | Fastened. | dis 45 & 10% | | | David's Patent. | dis 60 & 10% |
| Comix Slicer. | \$ 8.00 | Fastened. | dis 5 & 10% | | | | |
| Ash Sifters. | | Fastened. | dis 5 & 10% | | | | |
| E. Cornings' Barrel Head. | 10 1/2 | Fastened. | dis 5 & 10% | | | | |
| Hollow. | \$ 12.00 per doz net | Fastened. | dis 5 & 10% | | | | |
| Augers and Bits. | per doz \$25 dis 20% | Fastened. | dis 5 & 10% | | | | |
| Conn. Valley Mfg. Co. | | Fastened. | dis 5 & 10% | | | | |
| Ives. | 1st quality. | Fastened. | dis 5 & 10% | | | | |
| Beechot (French, Swift & Co.). | | Fastened. | dis 5 & 10% | | | | |
| Griswold. | | Fastened. | dis 5 & 10% | | | | |
| Nobis Mfr. Co. | | Fastened. | dis 5 & 10% | | | | |
| Diamond Hardware Co. | | Fastened. | dis 5 & 10% | | | | |
| Stell Mfg. Co. | | Fastened. | dis 5 & 10% | | | | |
| Jewell's Cut. | | Fastened. | dis 5 & 10% | | | | |
| Levi's Double Twist Bits. | 25 & 30 | Fastened. | dis 5 & 10% | | | | |
| Andrews' Bits. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| Griswold's Patent Bits. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| Expansive Bits. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| Ives. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| Blake's. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| Parneice's. | small, \$10; large, | Fastened. | dis 5 & 10% | | | | |
| Hollow Augers, Douglass'. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| Ives. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| French, Swift & Co. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| Brown's Adjust. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| Stearns'. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| Ives' Expansive. | each \$10 50 dis 40 | Fastened. | dis 5 & 10% | | | | |
| No. 4. French. | dis 22 & 30 | Fastened. | dis 5 & 10% | | | | |
| No. 5. Iron Handie. | dis 25 & 30 | Fastened. | dis 5 & 10% | | | | |
| Sprague's. | dis 25 & 30 | Fastened. | dis 5 & 10% | | | | |
| Percey's. | dis 25 & 30 | Fastened. | dis 5 & 10% | | | | |
| Hollow Augers, Douglass'. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| Star. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| W. T. Hartwell's. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| Lyons'. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| Sardine Scissors. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| Morse's Bit Stock Drills, List of Jan 1, '76. | dis 10 & 20% | Fastened. | dis 5 & 10% | | | | |
| Hammond's Ship Augers. | dis 10 & 20% | Fastened. | dis 5 & 10% | | | | |
| W. T. Hartwell's. | dis 10 & 20% | Fastened. | dis 5 & 10% | | | | |
| Augers, Best. | per gross 10-30 | Fastened. | dis 5 & 10% | | | | |
| Shouldered Peg. | per gross 25-35 | Fastened. | dis 5 & 10% | | | | |
| Patent Peg. | per gross 25-35 | Fastened. | dis 5 & 10% | | | | |
| Double Cut Gimlet Bits. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| Double Cut Gimlet Bits, Sheardson's. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| C. T. Valley Mfg. Co. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| Sprague's. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| Percey's. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| Hollow Augers, Douglass'. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| Star. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| W. T. Hartwell's. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| Lyons'. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| Sardine Scissors. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| Morse's Bit Stock Drills, List of Jan 1, '76. | dis 10 & 20% | Fastened. | dis 5 & 10% | | | | |
| Augers, Best. | per gross 10-30 | Fastened. | dis 5 & 10% | | | | |
| Shouldered Peg. | per gross 25-35 | Fastened. | dis 5 & 10% | | | | |
| Patent Peg. | per gross 25-35 | Fastened. | dis 5 & 10% | | | | |
| Double Cut Gimlet Bits. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| Double Cut Gimlet Bits, Sheardson's. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| C. T. Valley Mfg. Co. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| Sprague's. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| Percey's. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| Hollow Augers, Douglass'. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| Star. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| W. T. Hartwell's. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| Lyons'. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| Sardine Scissors. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| Morse's Bit Stock Drills, List of Jan 1, '76. | dis 10 & 20% | Fastened. | dis 5 & 10% | | | | |
| Augers, Best. | per gross 10-30 | Fastened. | dis 5 & 10% | | | | |
| Shouldered Peg. | per gross 25-35 | Fastened. | dis 5 & 10% | | | | |
| Patent Peg. | per gross 25-35 | Fastened. | dis 5 & 10% | | | | |
| Double Cut Gimlet Bits. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| Double Cut Gimlet Bits, Sheardson's. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| C. T. Valley Mfg. Co. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| Sprague's. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| Percey's. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| Hollow Augers, Douglass'. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| Star. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| W. T. Hartwell's. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| Lyons'. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| Sardine Scissors. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| Morse's Bit Stock Drills, List of Jan 1, '76. | dis 10 & 20% | Fastened. | dis 5 & 10% | | | | |
| Augers, Best. | per gross 10-30 | Fastened. | dis 5 & 10% | | | | |
| Shouldered Peg. | per gross 25-35 | Fastened. | dis 5 & 10% | | | | |
| Patent Peg. | per gross 25-35 | Fastened. | dis 5 & 10% | | | | |
| Double Cut Gimlet Bits. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| Double Cut Gimlet Bits, Sheardson's. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| C. T. Valley Mfg. Co. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| Sprague's. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| Percey's. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| Hollow Augers, Douglass'. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| Star. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| W. T. Hartwell's. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| Lyons'. | dis 10 & 10% | Fastened. | dis 5 & 10% | | | | |
| Sardine Scissors. | dis 10 & | | | | | | |

Shovels and Spades.
Sliding Door, M. W. & Co. List.....dis 40¢ to \$2
R. & E. List.....dis 5¢ to 25¢
" Patent Roller.....dis 25¢ to 25¢
" Hatfield's.....dis 30¢ to 25¢
Russell's Anti-Fiction.....dis 30¢ to 25¢
Sliding Shutter, R. & E. List.....dis 30¢ to 25¢
" Sargent's List.....dis 35¢ to 10¢

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Steel.

THREE
CLASS PRIZE MEDALS.
CLASSES 1, 21, 22,
at EXHIBITION OF INDUSTRY
LONDON, 1851.

MEDAL OF HONOUR,
SOCIETY OF ARTS & INDUSTRY,
LONDON, 1856.

1st CLASS
PRIZE MEDAL, CLASS 18
UNIVERSAL
EXHIBITION OF INDUSTRY
PARIS, 1855.

COCKER BROTHERS,
(Limited.)
SUCCESSORS TO
SAM'L COCKER & SON,
(Established 1752.)
SHEFFIELD, ENGLAND

MANUFACTURERS OF

CAST, SHEAR, SHEET AND BLISTED STEEL, OF EVERY DESCRIPTION.
BEST CAST STEEL WIRE, ADAPTED SPECIALLY FOR MECHANICAL PURPOSES:
Also for ROSES, NEEDLES, FISH HOOKS, PINS, CRINOLINE, &c.

BEST CAST STEEL FILES, SAWS, EDGE TOOLS,
HACKLES, GILLS, CARD CLOTHING, CARD TEETH, HACKLE AND GILL PINS,
FISH HOOKS, NEEDLES, &c.

ALSO
GENERAL MERCHANTS.

F. W. MOSS,

Successor to JOSHUA MOSS & GAMBLE BROS.

FRANKLIN WORKS,
WADDELEY BRIDGE WORKS,
WALKLEY WORKS, { SHEFFIELD, ENGLAND.

STEEL AND FILES.

Principal Depots: 80 John St., N. Y., and 512 Commerce St., Phila.

MOSS & GAMBLE SUPERIOR C. S. "FULL WEIGHT" FILES,

Cast Steel Hammers and Sledges. Also, "M. & G." Anvils and Vises.

WARRANTED CAST STEEL, especially adapted for DIES and TURNING
PUNCHES and all kinds of MACHINISTS' TOOLS.

Celebrated Improved Mild Centre Cast Steel, for Taps, Reamers, and Milling Tools.

Warranted not to crack in hardening Taps of any size.

Swede Spring Steel, especially adapted to Locomotive and Railway Car Springs.

English Spring and Plow Plate Steel.

Sheet Cast Steel Shear, German, Round Machinery, Hammer, Fork and Shovel Steel

GENERAL MERCHANT.

WILSON HAWKSWORTH, ELLISON & CO.,

Vienna Universal Exhibition, 1873.
THE MEDAL FOR MERIT
Awarded for Excellence & Perfection
in Manufacturing & Workmanship.

W. H. E. & CO. have pleasure in announcing the
Award of the MEDAL FOR MERIT for their Exhibit
of Crucible Cast Steel, at the Vienna Universal
Exhibition, 1873. Award to any Exhibitor of
STEEL WIRE in the British section.

Manufacturers of
STEEL,
Steel Wire, &c., AND GENERAL
MERCHANTS.

CARLISLE WORKS, SHEFFIELD, ENG.

New York, 72 John Street.
Philadelphia, 505 Commerce Street.

Agencies: Boston, 21 Oliver Street.
New Orleans, La. 111 Gravier St.

Isaac Jenks & Sons,
MINERVA AND BEAVER WORKS, WOLVERHAMPTON, ENGLAND.

MANUFACTURERS OF
JENKS' SPRING STEEL, "MINERVA" SWEDES, AND "ANGLO" CAST SPRING STEEL
"JENKS" TIRE, TOE CORK, SLEIGH SHOE, BLISTER, AND PLOW STEEL;
ALSO,
"BEAVER" PLOW, TIRE, AXE, AND SHEET IRON.

VAN WART & McCOY, Agents, 134 & 136 Duane Street, N. Y.

J. & RILEY CARR,
MANUFACTURERS OF SUPERIOR
STEEL

For Tools, Cutlery, Saws, Files, Augers, Gimblets, &c.; Sheet Cast Steel for
SPRINGS AND STAMPING COLD;

ALSO THE CELEBRATED

DOG BRAND FILES.

Unsurpassed, if equalled in quality.
ley Lane Works, Sheffield, England.
Warehouse, 82 John St., New York.

Established 1810.



HENRY MOORE, Attorney.

G. SANDERSON & CO.,

Manufacturers of all descriptions of

STEEL.

SHEFFIELD, ENGLAND.

Particular attention is paid to quality and temper for
Files, Saws, Table and Pocket Cutlery, Augers, Shovels, &c.
ALSO STEEL of superior quality for Turning Tools, Taps, Dies, Drills, &c.
Hot and Cold Rolled Sheets for Clock Springs, Corset Clasps, Pens, &c.
Makers of the Celebrated ROCK BORING DRILL STEEL.

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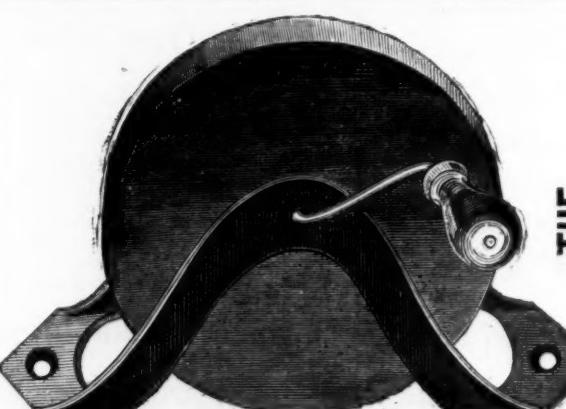
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7 Ground and 2d floor plans of Brick Villa. Scale indicated on plate.
8 Perspective view.
9 1st and 2d floor plans of a Frame Villa. Scale indicated on plate.
10 Front elevation.
11 1st and 2d story plans of a Frame Villa.
12 Perspective view.
13 Perspective view of a Villa. Plans similar to Design 7.
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16 1st and 2d story plans of Brick Villa. Scale indicated on plate.
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19 Perspective view.
20 Perspective view of Brick Villa. Plans similar to Design 10.
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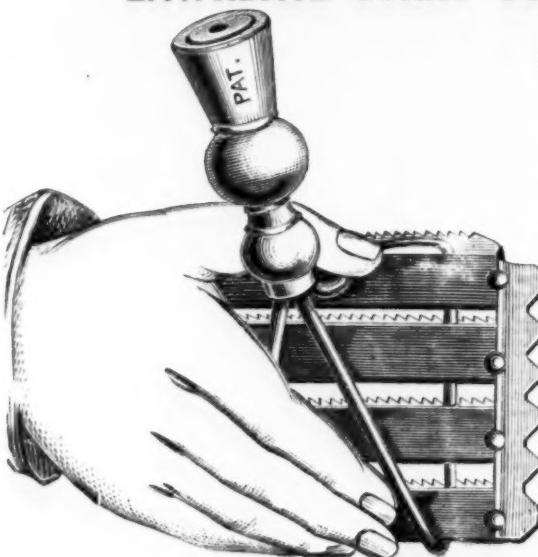
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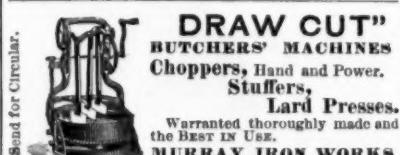
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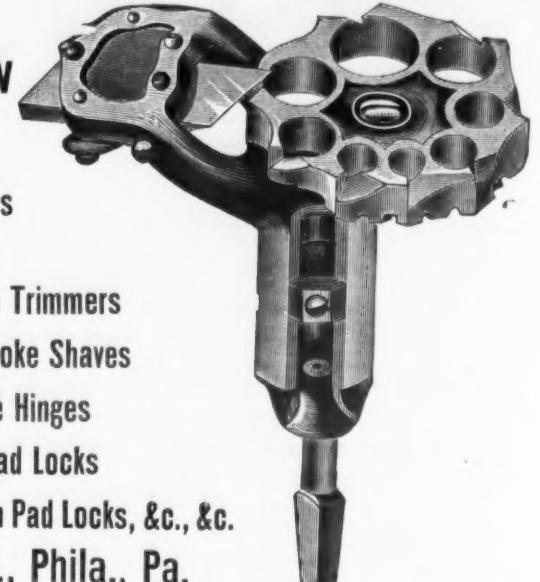
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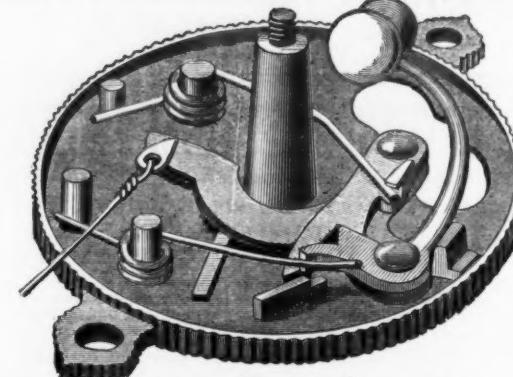
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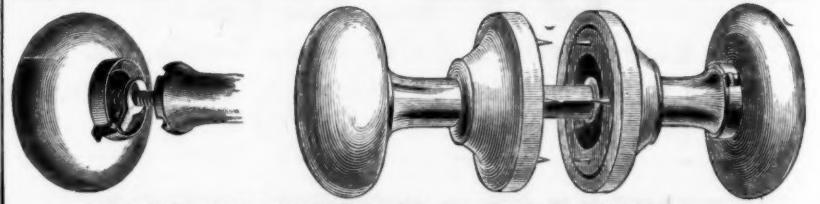
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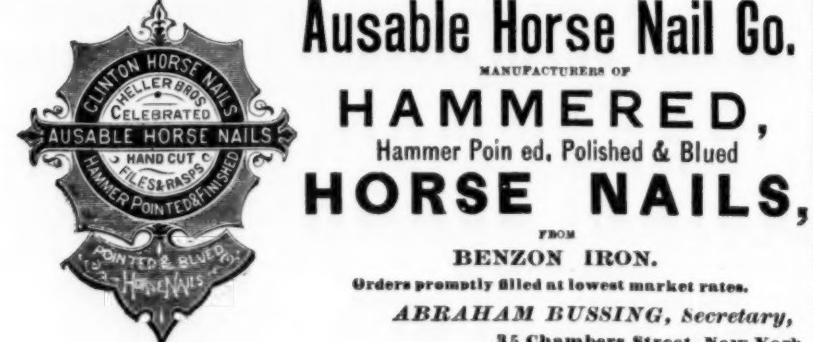
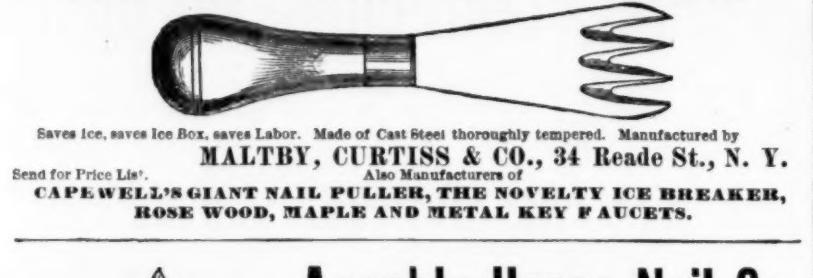


Patented September 3, 1867, February 6 and 18, 1872.
THE IDENTICAL PROCESS OF HAND-CUTTING FILES APPLIED TO MACHINERY.

No Mistake about it this time.

The owners of these patents desire to sell them or to form companies to manufacture Files, File Blanks and File Handles under the Royalty System. Address,
A. WEED & CO., 355 Atlantic Ave., Boston.

THE NATIONAL ICE SHAVER.



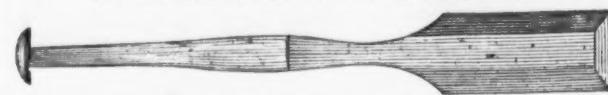
GLOBE NAIL COMPANY,
MANUFACTURERS OF
Pointed, Polished & Finished Horse Shoe Nails

Recommended by over 20,000 Horse Shoers.
All nails made from best NORWAY IRON, and warranted perfect and ready for driving. Orders filled promptly and at lowest rates by

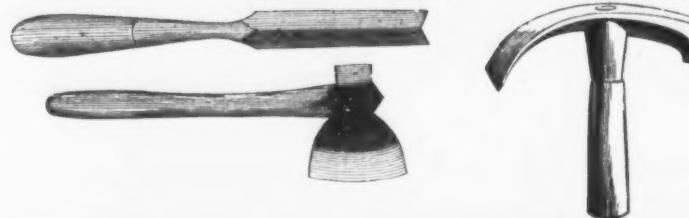
GLOBE NAIL CO., Boston, Mass.

MACK & CO.

SUCCESSORS TO
D. R. BARTON & CO.,
At the Old Stand, 136 Mill St., ROCHESTER, N. Y.
Sole Manufacturers of the
D. R. BARTON & CO. BRAND OF



Carpenters' Coopers' and Pump Makers' TOOLS.



Large Knives and Barrel Machinery.

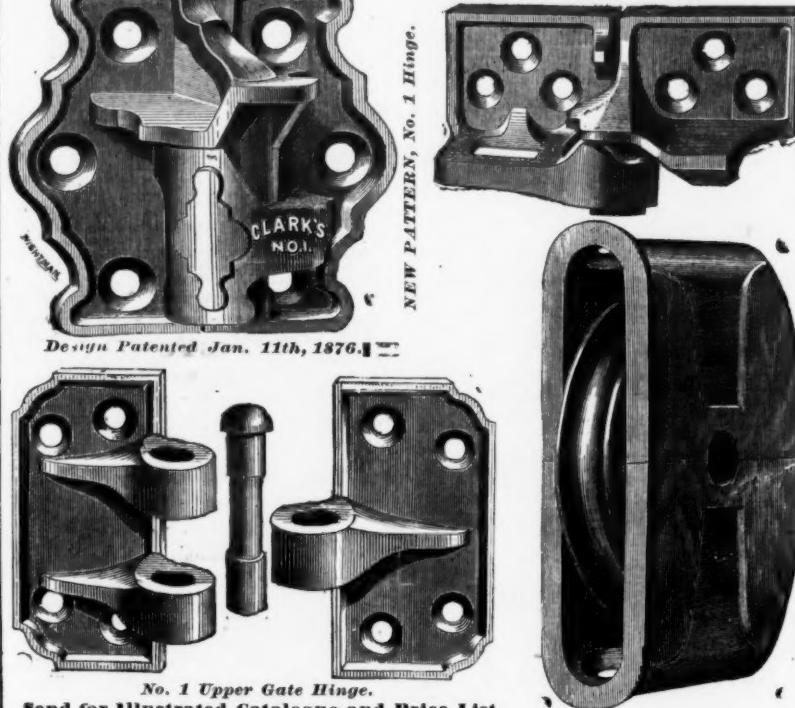
All Tools made by us are stamped **D. R. BARTON & CO.**

All goods stamped **D. R. BARTON & CO.**, are made at the Old Works, and by the old men, from the English Steel, manufactured for us by Thos. Firth & Sons and Wm. Jessop & Sons, and fully warranted.

Goods stamped **D. R. BARTON** are not made at the Old Works of the company but by a new stock company formed about the time of Mr. Barton's decease.

CLARK & CO.,
MANUFACTURERS OF
BUILDERS' HARDWARE.

BUFFALO, N. Y.

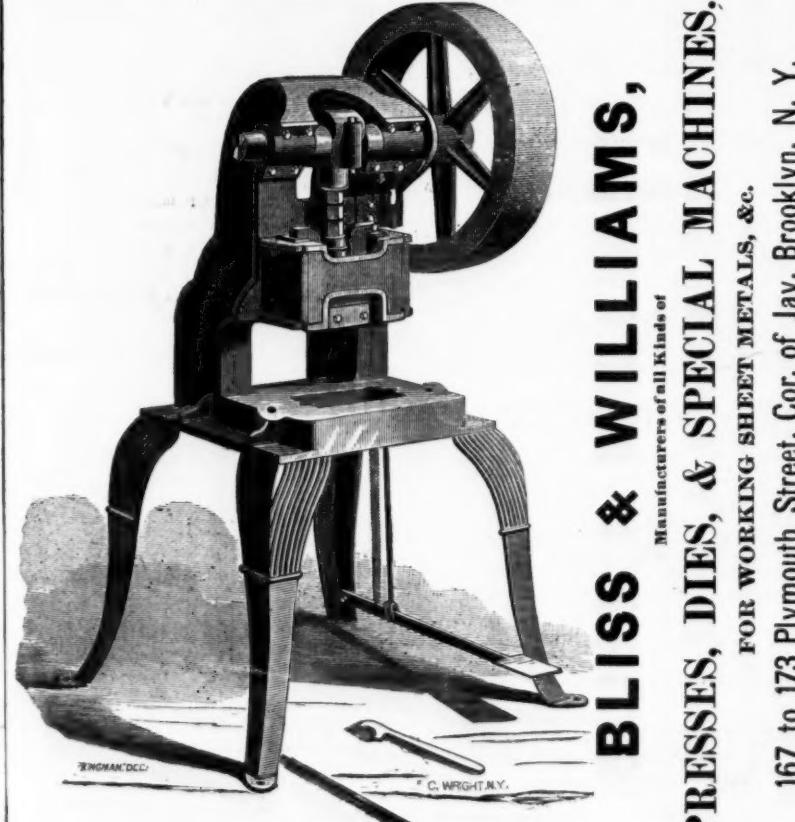


Two First Premiums awarded by Franklin Institute Exhibition of 1874.

C. VAN HAAGEN & CO.,
2341 and 2343 Callowhill Street, PHILADELPHIA, PA.

Manufacturers of Latest Improved Machine Tools, Rotary Sharers, two sizes; Iron Planers, all sizes, Horizontal Drill Attachments, for upright power drills, Self-feeding Portable Drills, hand or power, Expansion Boring Bars, five sizes, Universal Slide Rest, for taper work, Twist Drill Sharpening Machines, automatic and adjustable in every direction, Noiseless Friction Gears, for transmitting up to thirty horse-power.

Send for Descriptive Circulars.



EMERY
WELLINGTON MILLS.

USE THE BEST.
THE BEST IS ALWAYS
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Belcher Bros., - Providence, R. I.
Baeder, Adamson & Co., Chicago, Ill.
Perin and Gaff Mfg. Co., Cincinnati, O.
Clemens Vonnegut, Indianapolis, Ind.
Geo. M. Way & Co., - Hartford, Ct.
F. S. Bradley & Co., - New Haven, Ct.
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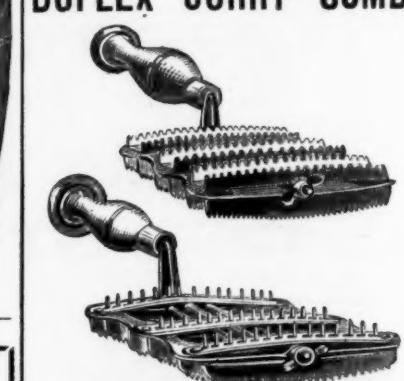
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Curry Comb.

The Best yet Invented.
CHEAP AND DURABLE.
Is Pleasant to the Horse, and does not injure the Brush.

FULLER BROS., Sole Agents,
89 Chambers & 71 Reade Streets, N. Y.
DUPLEX CURRY COMB.



We call the attention of Hardware Dealers to our Double Curry Comb, comprising a fine and coarse side; or vice versa, as the case may be. It is small, light and novel, and needs no adjustment to convince any one of its practicability. It sells on sight, and is bound to supersede all other combs. We want one reliable dealer in each state or large city to handle it. Correspondence solicited.

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Fredericktown, Ohio.

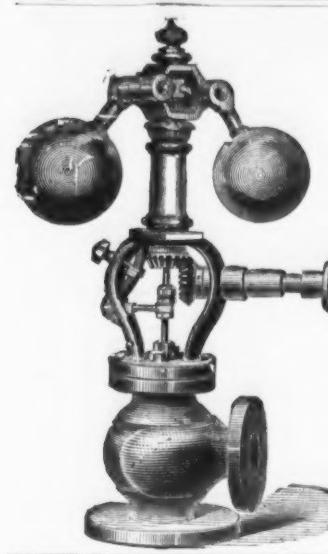


CROOK, HERRING & CO.,
Pattern and Model Makers,
AND MACHINISTS.

Corner Centre and White Sts., New York.
Over Harlem R. R. Freight Depot (Room 8).
We make a specialty of fine Machinery and Models for the Centennial, Experimental and Patent Office Models.

Manufactured by
CRANES BROS. MFG. CO.
CHICAGO.
COOKE & BEGGS, Agts.
16 Cortlandt St., N. Y.

STEAM PUMPS



TO ALL WHO USE STEAM POWER!

We will put our Governor on any Engine, and guarantee it to prove itself superior to all others.
If, after a fair trial, it does not, we will take it off at our own expense.

Shive Governor Co.
BETHLEHEM, PA.

ALSO
SHIVE'S PATENT WATCHMAN'S CLOCK AND DETECTOR,
AND
Buoy's Patent Counter Scale,
No Nest of Weights.

Circulars sent free.

Reduced Price List, JANUARY 25th, 1876.

For dimensions of Governor, see Illustrated Price List.



Improved Steam Governor.

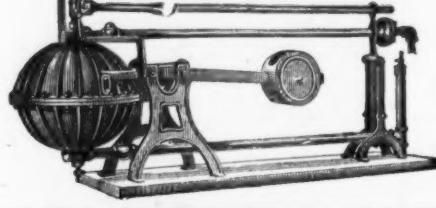
No Charge for Boxing & Cartage.

JUNIUS JUDSON & SON, Rochester, N. Y.

THE JUDSON GOVERNOR.

It is a common method to advertise Governors with the *cost*, use, and *service* to the *customer*, and charge *High Prices* for doing what any good Governor will do. Various Governors inferior to the "Judson" are sold in this way, operating well enough for three months, to insure collection of the pay, but becoming useless after a year, from want of construction and durability. The Judson Governor is guaranteed to be not only the best Regulator of Steam Engines, but also the most durable Governor made. Parties in buying other Governors should stipulate that their durability be guaranteed, and should also take care to see that the more inferior Governors, pay higher prices than those shown in the accompanying list. We guarantee the Judson Governor will do all any other Governor can do, and in Accuracy and Durability—the main essentials—we guarantee it shall do more.

The Albany Steam Trap.

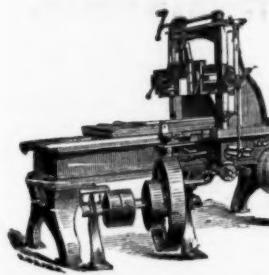


This Trap automatically drains the water of condensation from *Heating Coils*, and returns the same to the Boiler whether the Coils are above or below the water level in Boiler, thus doing away with pumps and other mechanical devices for such purposes. Apply to

Albany Steam Trap Company,
Albany, N. Y.

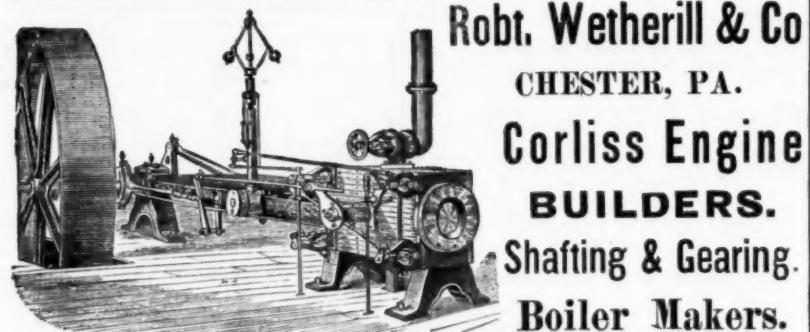
The Pratt & Whitney Co., Hartford, Conn.,

Have constantly on hand and making



Drop Hammers

Of recently Improved Construction. Pony Trip Hammers, Blacksmiths' Sheaves, Broaching and Stamping Presses, Iron Shop Cranes, Machinists' Tools, Gun and Sewing Machine Machinery. Make to order Gray and Charcoal Iron Castings of all styles and sizes not exceeding 15 ton weight, (making patterns if desired). Furnish Clamp Pulleys of light patterns, cut gears in a superior manner, &c., &c.



Robt. Wetherill & Co.
CHESTER, PA.
Corliss Engine
BUILDERS.
Shafting & Gearing.
Boiler Makers.



THORNE, DeHAVEN & CO.

21st Street, above Market,
PHILADELPHIA.

DRILLING MACHINES.

PORTABLE DRILLS. Driven by power in any direction, self-feed and convenient adjustment.

RADIAL DRILLS. Self-feed—large adjustable box table—separate base plate, every convenience.

VERTICAL DRILLS. Self-feeding—of new and improved designs.

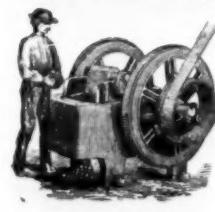
MULTIPLE DRILLS. For boiler work, etc., 2 to 20 spindles, fed and returned by power or hand, together or separately.

HORIZONTAL BORING AND DRILLING MACHINES. For large pieces—with boring head, adjustable, vertically and horizontally.

SPECIAL DRILLS. For special work. Gun Blank Drills, Coal Drills, &c., built to order.

BLAKE'S PATENT STONE & ORE BREAKER.

New Pattern with Important Improvements & Abundant Strength



For reducing to fragments all kinds of hard and brittle substances, such as STONE for making the most perfect MACADAM ROADS, and for making the best CONCRETE. It breaks stone at trifling cost for BALLASTING RAILROADS. It is extensively in use in MINING operations, for crushing

IRON, COPPER, ZINC, SILVER, GOLD, and other ORES, Also for using QUARTZ, Fluor, Emery, Corundum, Feldspar, Coal, Barytes, Manganese, Phosphate Rock, Plaster, Soapstone, &c. For illustrated Circulars, and particulars, address,

BLAKE CRUSHER CO., New Haven Conn.

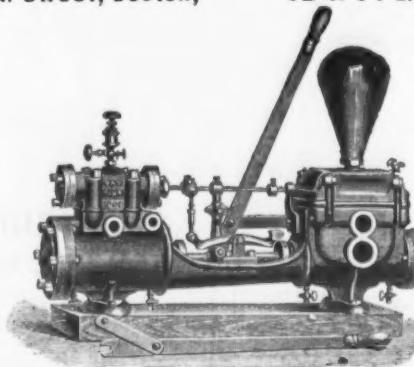
Knowles Patent Steam Pumps

MANUFACTURED BY THE

KNOWLES STEAM PUMP WORKS, WARREN, MASS.

WAREHOUSES:

14 & 16 Federal Street, Boston, 92 & 94 Liberty Street, N. Y.



Cut above represents regular Boiler Feed Pump, No. 3 and 4. Showing New Patent Valve Motion, and Hand Power LEVER Attached and Detached.

FIRE PUMPS a specialty.

Mining Pumps (both Double Acting Plunger, and Piston Pattern,) which we guarantee to run absolutely noiseless on any lift from 100 to 600 ft., at a single lift, a specialty. Pumps for every possible duty. Prices as low as any, and our workmanship and material altogether the best.

Every machine furnished under a complete guarantee.

THE EMPIRE FAN BLOWING PORTABLE FORGES.

Patented in U. S. Nov. 25, 1873. Patented in Canada May 28, 1874.

COSTING FROM \$16.00 TO \$75.00.

We desire to call your attention to our new Forge, No. 12. They are especially convenient for Boiler Makers' repairs, weighing only 50 lbs.; they can be easily carried around the country, and will make a fire hot enough to melt iron in minutes. They are a very useful tool for Machinists to set up on their work bench—always ready and handy for moving and taking tools, and like work—and are so cheap that every mechanic can afford to complete his "kit of tools" by owning a Forge. We make 28 sizes of Portable Forge, designed for all purposes of metal working. Send for catalogue to

EMPIRE PORTABLE FORGE CO. Troy, N. Y.

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Punching Presses.

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I warrant every part of this Machine to stand the shock of the wheel running at 125 revolutions.

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HAMMER & CO., Branford, Conn.,

Manufacturers of the following Patented Articles of

MALLEABLE IRON:

Hammer's Adjustable Clamps.

Hammer's Malleable Iron Oilers.

Hammer's Mall. Iron Hand Lamps.

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For sale by all the principal Hardware Dealers.

Malleable Iron Castings

Of Superior Quality made to order

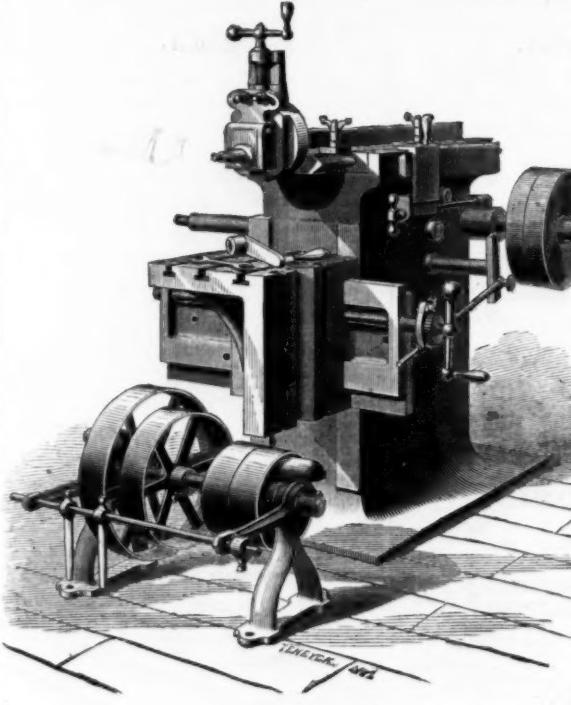


THE HENDEY MACHINE CO.

MANUFACTURERS OF

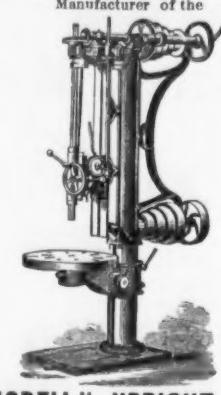
THE MANVILLE Patent Planers and Shaping Machines.

WOLCOTTVILLE, CONN.



Any length of stroke from $\frac{3}{4}$ to 24 inch in length, while machine is running with perfect uniformity of speed of cutting tool. Automatic cross feed of 19 inch and 16 inch, from top of table to bottom of slide when table is down. Send for Circular and Price List.

P. BLAISDELL & CO.,
WORCESTER, MASS.,
Manufacturer of the



"BLAISDELL" UPRIGHT DRILLS
And other First-Class Machinists' Tools.

Machinists' Tools.

Engine Lathes, Planers, Upright Drills,
Hand Lathes, &c.,

Of best quality, in stock at low prices.

LATHE & MORSE TOOL COMPANY,
Worcester, Mass.

IMPROVED Engine Lathes

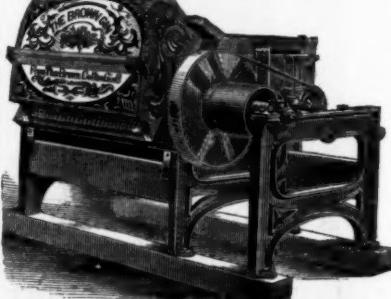
SCREW MACHINES, &c.
JONES, LAMSON & CO.,
Windsor, Vt.

The Whitmore Engine.
SAFEST, CHEAPEST & BEST.
Lovegrove & Co.,
No. 121 South Fourth Street,
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Sole Manufacturers
Engines, Boilers and
Steam Pumps.

Anti-Friction Metals.

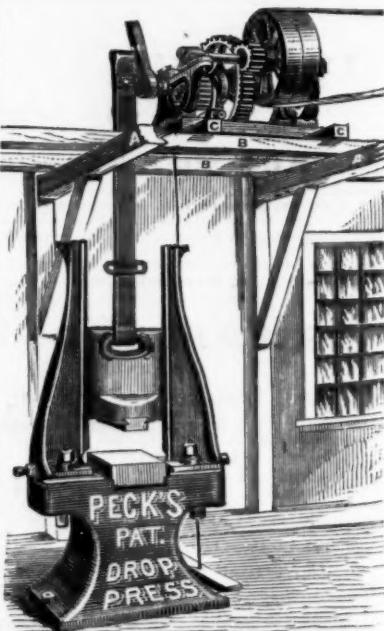
Unequalled for Durability, and Adapted to all weights and speeds.

Manufactured by
"STANDARD" METAL CO.,
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The Brown Cotton Gin Co.
NEW LONDON, CONN.
Manufacturers of
COTTON GINS,
With or without
Self-Feeding Attachment & Condenser.

Cotton Gin Saws, Ribs and other Gin materials. Also Albertson's Segment Screw Cotton, and B. Peck's. Send for Circular.



I have the largest and best stock of Drop Press Patterns in the country—suitable for Forging, and all kinds of Sheet Metal work.

WHY THE BEST:
It requires less power, works faster, gives a harder blow when same weight of hammer, the rebound of the blow, is caught without lessening the force of the blow, the blow is uniform and not affected by variations in the speed of the driver. It is always in order. The Drop Press is a specialty.

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Machinery, &c.

THE

Shapley Engine

Patented Feb. 10, 1874.

COMPACT,
PRACTICAL,
DURABLE,
ECONOMICAL.

\$200.00.

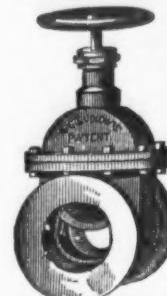
Cheaper than any Engine offered of
the same capacity.

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SHAPLEY & WELLS,

Binghamton Iron Works,

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Manufacturers of Steam Engines, Rollers, Water Wheels, Circular Saw Mills and
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VALVES(Double and Single Gate, 3 in. to 48 in.—outside and inside Screws, Indicator, &c.)
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Also FIRE HYDRANTS.

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Engineer, Machinist, Founder and Boilermaker

CASTINGS of every description.

ROLLING MILL AND FURNACE EQUIPMENTS COMPLETE
Rolls Turned for Rails, Beams, Angles, and all shapes for Iron, Steel, or
Composition Metals.Sugar Mill, Saw Mill and Grist Mill Machinery,
AND MILLWRIGHTING IN GENERAL.BOILERS—FLUE, TUBULAR AND CYLINDER, and all kinds of
TANK AND PLATE IRON WORK.**WILSON MANUFACTURING COMPANY,**

NEW LONDON, CONN.

MANUFACTURERS OF

SOLID BOX VISES.

With or without Convex and Concave Washers.

Jackscrews, Braces, Coffe Mills, Turning Lathes, Clamp
Heads and Screws, Parallel Bench Vises, Sash Pulleys, Ho
House Pulleys, Composition Clocks, Bench Screws, Visa Screws,
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Sheaves, Block Pins, Composition Roller and Iron Bushings,
Riggers' Screws, Caulkers' Tools, Pump Chambers, Belaying
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Hardware.

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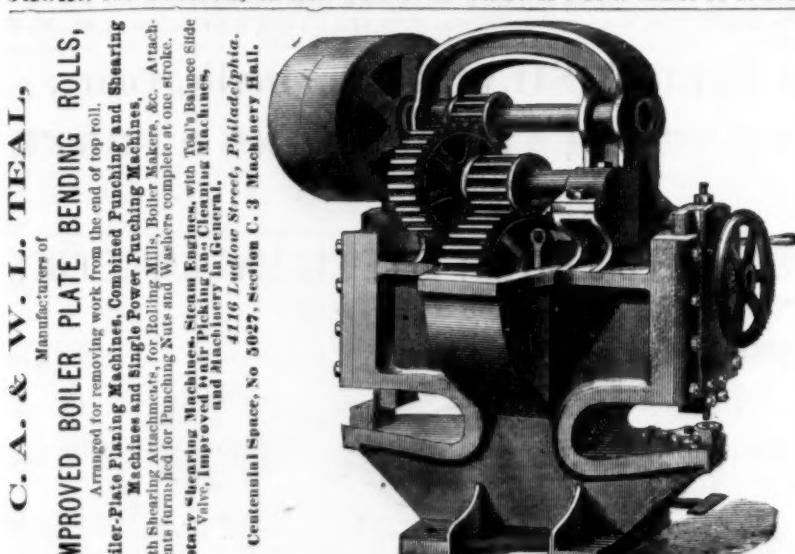
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MAKER AND PATENTER OF

Hydraulic Jacks and Punches.ROLLER TUBE EXPANDERS
And Direct-Acting Steam Hammers.

Communications by letter will receive prompt attention.

JACKS for Pressing on Car Wheels or CRANK PINS made to order



C. A. & W. L. TEAL.

Manufacturers of
IMPROVED BOILER PLATE BENDING ROLLS,
Arranged for removing work from the end of top roll.
Boiler-Plate Planing Machines, Combined Punching and Shearing
Machines and Single Power Punching Machines, &c., Attach-
ments furnished for Punching Nuts and Washers complete at one stroke.
Rotary Strengthening Machines, Steam Engines, with Tola's Balance Slide
Valve, Improved Rail Pickling and Cleaning Machines,
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Centennial Space, No. 5027, Section C. 3 Machinery Hall.

Machinery, &c.

Established 1848.

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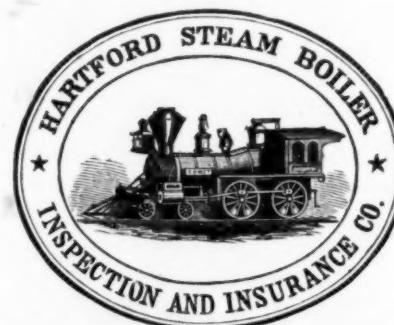
Engineers, Iron Founders and Machinists.**RAILWAY SHOP EQUIPMENTS.**

Our Steam Hammers, Lathes, Planers, Drills and Bolt Cutters

Are of Improved and Patented Construction.

Railway Turning and Transfer Tables,**SHAFTING & MILL GEARING, a specialty.****Pivot Bridges.****GIFFARD'S INJECTOR--IMPROVED, SELF-ADJUSTING.**

FAIRMOUNT MACHINE WORKS,
Office, 2106 Wood St., Philadelphia
Manufactures as Specialties
POWER LOOMS,
SPOOLING, BEAMING, DYEING and
Sizing Machines.
PATENT BOBBIN WINDING MACHINES
wind direct from
bank or skein to shuttle bobbin.
SHAFTING
With Patent Adjustable self-oiling Bearings,
Adjustable Self-Oiling Hangers,
8, 10, 12, 15 and 18 in. drop,
Ball and Socket Self-Oiling Pillow Blocks,
Pulleys, from 4 inch to 10 feet in diameter.
Pulleys made in two parts,
any size required.
SELF-ACTING WOOL-SCOURING MACHINES,
LARD and PARAFFINE OIL PRESSES.
Improved
Power Hoisting Machines.
Machine and Foundry Work in all
their branches
Plans taken, and Factories fitted out com-
plete with shafting and Gearing
Send for list of Pulleys, &c.
THOMAS WOOD.



Issues Policies of Insurance after a careful Inspection of the Boilers'

COVERING ALL LOSS OR DAMAGE TO

Boilers, Buildings and Machinery,

ARISING FROM

STEAM BOILER EXPLOSIONS.

The Business of the Company includes all kinds of STEAM BOILERS

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CONTRACTORS FOR

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Offices, No. 10 South Delaware Ave., Philad'a.

Machinery, &c.

REPORT OF JUDGES

In Department F, Group 3, at the 44th
Exhibition of theAMERICAN INSTITUTE,
Held in the City of New York, Oct., 1875.No. 318. Drawing, Drop &
Punching Presses.
THE STILES & PARKER PRESS CO.,
Of Middletown, Conn.The machinery exhibited by these makers is of a
character that calls for special commendation. In
addition to their well known punching presses, to
which a new feature has been added in a press ad-
justable to an inclination for discharging work left
above the die, there are exhibited by them a com-
bined punch and shears, a drawing or blanking press,
and a drop press.In all these there is shown the highest mechanical
culture, applied to meet every practical requirement,
to avoid every practical difficulty, and to enlarge the
range of application of the machines, by devices
which are at once simple, elegant, and effective.Your committee would unhesitatingly recommend
for the exhibition the "Medal of Progress," but
find such a medal awarded by the rule of the Institute,
denying such award unless a Silver Medal has
been previously awarded. We, therefore, respectfully
recommend the award of a Silver Medal.Silver Medal Awarded.
A true copy from the Report on file.
JOHN W. CHAMBERS, Sec'y.

AQUOMETER
Steam Pump.

Highest Premium awarded by
Franklin Institute, 1874,
For Simplicity, Economy of
Construction & Efficiency.

An absolutely Durable, Cheap, Efficient and Eco-
nomical Steam Pump. Requires no special care or
lubricating. Warranted. Address for circular.
AQOMETER STEAM PUMP CO.,
10 South Delta Avenue, Philadelphia,

EUREKA SAFETY POWER!

Practically impossible to
explode. Tested to 300 lbs.
pressure per square inch. Will
raise 2 inches second. Per minute
pounds Corn per hour. Price
\$250. Also, Stationary Engines
and Boilers and Spark Arrest-
ers. Portable Safety Power for
plantation use. Send for cir-
cular. Discount to the trade.

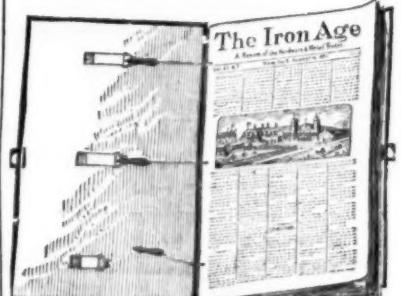
B. W. PAYNE & SONS,
Corning, N. Y.

The Frazer Axle Grease
and Lubricator.

A pure Lubricator, free from water, sun or sed-
iment. The best article made for Wagons, Open
Journals, Cog wheels, Rollers and wherever
a Solid Lubricator or Grease can be applied.
Put up in Boxes, Kegs and Barrels. For prices see
New York Price List in this paper.
Established 10 years.

Frazer Lubricator Company,
104 Malden Lane, New York.

Get Binders
FOR THE IRON AGE.



We have made arrangements to furnish Koula's
PATENT BINDER, which we think altogether the best
before the public, to our subscribers at the following
very low rates—about the wholesale prices by the
dozen.

Half Cloth \$1.00 each.
(Cloth Back and Corners, with Mor-
occo Paper Sides—a good ser-
vicable Binder.)

Full Cloth 150
(Morocco Cloth Back and Sides.)

Half Morocco 200
(Morocco Back and Corners; Cloth Sides.)

The above are all in black, which is the most ser-
vicable color, with the exception of the Half Mor-
occo, which are put up in a number of handsome
shades. The name of the paper is stamped in gold
on either side, and each Binder is furnished with
loops by which it can be hung up against the wall a
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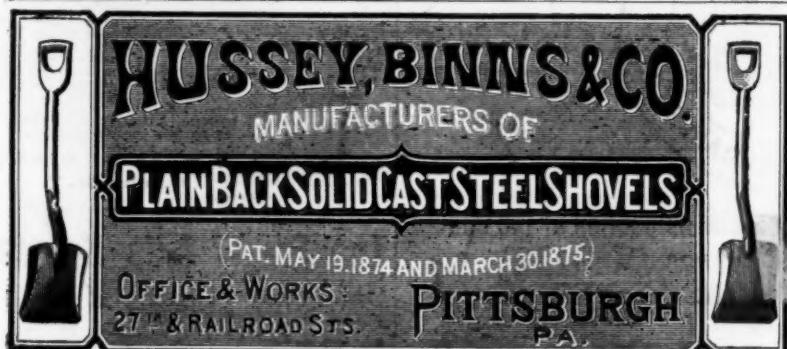


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